City of Portsmouth

PORTSMOUTH RAILROAD TRACK SURVEY
and
EVALUATION PROJECT

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1985

Andrews & Clark, Inc.
Consulting Engineers
Amherst, NH

Final Report

PORTSMOUTH RAIL TRACK SURVEY AND EVALUATION PROJECT

Prepared for:

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Planning Department, City of Portsmouth,
New Hampshire

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CHARLESTON, SC 29405-2413

Prepared by:

Andrews & Clark, Inc.
Consulting Engineers
Amherst, New Hampshire

HE1613.A4 P6 1985

DEC 29 1992

March, 1985

Acknowledgements

Sincere appreciation is extended to Mr. Craig Wheeler and Mr. David Holden of the City of Portsmouth Planning Department for their assistance during the Physical Plant Inspection of this project.

The New Hampshire Coastal Program provided a Grant for the preparation of this Report which was funded in part by the Coastal Zone Management Act of 1972, as amended as administered by the Office of Ocean and Coastal Resource Management, National Oceanic Atmospheric Administration.

Summary of Comments, Changes and Additional Information to the Draft Report of November 19, 1984

The presentation of the Draft, Portsmouth Railroad Track Survey and Evaluation Project on December 20, 1984, before the Portsmouth Planning Board, represented a mile post in the investigation of the B&M owned rail line in the City of Portsmouth.

Verbal comments and discussions following the presentation were varied. Although several questions were directly related to the report's contents, numerous questions from the public sector concerned subject matters not within the scope or intent of the report. Unrelated subjects included the condition of the Naval Yard Branch, the volatility of materials and specific contents of rail tank cars. For informational purposes, minutes of the Planning Board Meeting of December 20, 1984, as transcribed by the City, is contained in Appendix D. Also contained in Appendix D is correspondence from the Public Utilities Commission which includes additional derailment data for 1977 to 1979 and 1983 not found during the original research at the P.U.C. This supplemental information addresses concerns of the public as to missing derailment data.

Questions concerning the investigation of rail grade crossings were aired. Although roadway grade crossings, as such, were not within the limited scope of the Study, the rail track geometric and physical condition was evaluated from the standpoint of movement of rail freight traffic through grade crossings in accordance with F.R.A. Class 1 and Class 2 Standards.

The primary goal of the study was a Physical Plant assessment of the B&M Rail line, therefore, the commodity types and volumes presented in the Draft report were intended for general information only.

Decision of the Planning Board

The City Planning Board Voted unanimously to recommend to the City Council that the rail "survey" be carried on in an intensive manner and that it (the Survey) be financed or funded. In addition, the City Engineer and other City officials reviewed the report. Comments made during the Planning Board meeting would be incorporated in the project report.

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List of Figures and Photos

Miscellaneous

Appendicies

*Information received following the December 20, 1984 presentation of the Draft Report.

I. EXECUTIVE SUMMARY

I Executive Summary

The intent of the Portsmouth Rail Track Survey and Evaluation Project as presented in this document is to assess track physical condition and geometric configuration on the Portsmouth, Hampton and Newington Branch Lines, (see Figure No. 1). Track condition and geometry were then compared to current Federal Railroad Administration (F.R.A.) Class 1 (10 mph) and Class 2 (25 mph) rail freight criteria. Prior to actual field inspection, the New Hampshire Public Utilities Commission was contacted to ascertain location of previous freight derailments with the intent of inspecting those locations for existing defects.

Results of the intensive four (4) day field inspection by Andrews & Clark resulted in the documentation of eight (8) rail defects relating to track condition and geometry as dictated by F.R.A. Class 1 and Class 2. In addition, general defects such as vegetation and drainage were found. At the time of inspection, B&M Rail crews were encountered on the Newington Branch north of Cutts Avenue. An Inspection was made on that section prior to commencement of maintenance work. Numerous existing ties were marked for replacement. It was observed that 130 lb. rail had been positioned near the track in anticipation of impending replacement of the existing 75 and 85 lb. rail.

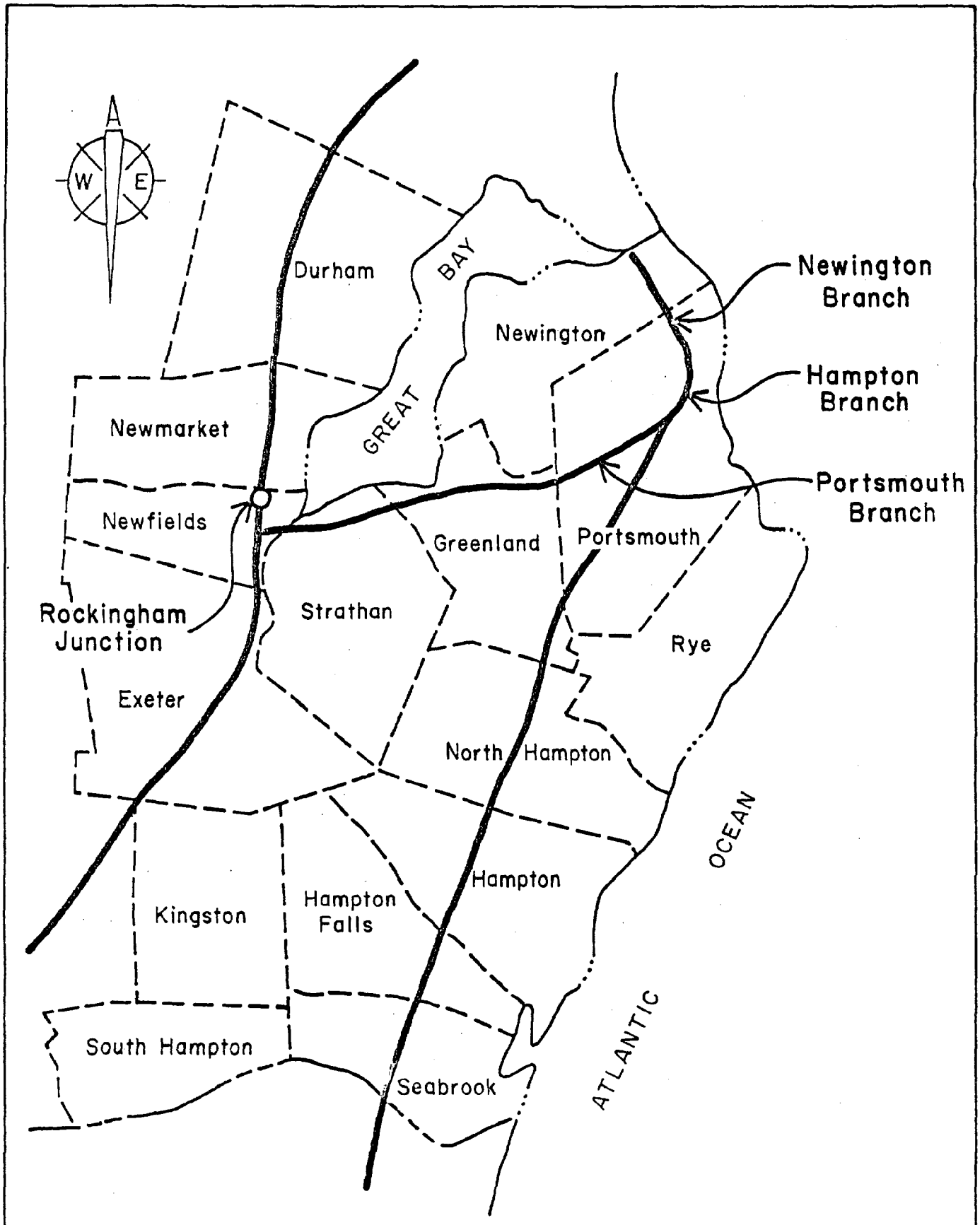
Assuming that the defects found during the inspection are corrected (see Recommendations), the Portsmouth and Hampton Branches will meet or exceed F.R.A. Class 2 (25 mph) minimum requirements. The Newington Branch, after completion of on going maintenance, will meet or exceed F.R.A. Class 1 (10 mph) requirements. It is estimated that approximately 1,000 new ties would be required to upgrade this line to Class 2 minimum standards. The tie replacement program would include lining and surfacing of the track.

It is further recommended that the entire branch line system be evaluated by a track mounted recording rail geometry vehicle. This procedure, although not required by F.R.A., would identify minor geometric deviations and provide data for future lining and surfacing

work. The intent of this procedure would be to create a smoother ride.

It must be made very clear that track condition documented reflect observations at a point in time and that additional deficiencies may occur during normal rail freight operations, therefore continued inspection of these lines is necessary.

Rail freight traffic commodity types and yearly system carload totals are contained in Exhibits 1-4 under the Rail Traffic Evaluation Section of this report. Generally, traffic on the branch line system is moderate. Actual yearly carload volumes by commodity type on each branch line is not presented due to the confidential nature of the information. However, as expected, due to the proximity of storage facilities for volatile materials on the Newington Branch Line, a significant portion of the branch commodity total is volatile material. It should also be noted that all inbound and outbound carloads on that line pass through Portsmouth.



Branch Location Plan

FIGURE #1

II. FUNDING

II Funding

Funding for this Project was obtained through a Coastal Energy Impact Program Grant, administered by the Office of State Planning. Additional matching funds were supplied by the City of Portsmouth.

III. SCOPE OF STUDY

III Scope of Study

This study is a result of concerns aired by private citizens and public officials of City of Portsmouth and Representatives to the General Court from the Portsmouth area as to the condition of the Boston & Maine Corporation rail lines within the City of Portsmouth. (see Figure No.s 2, 3 & 4).

Generally the three areas of investigation are as follows:

a. The Portsmouth Branch northeast from the Greenland/ Portsmouth Town Line to the Hampton Branch.

b. The Hampton Branch from Emery Junction north to the Newington Branch.

c. The Newington Branch* northwest to the Portsmouth/ Newington town line.

The study was subdivided into a Physical Plant Assessment, a Rail Traffic Evaluation and Recommendations.

The Physical Plant Assessment included: Data Collection, Field Inspection and Evaluation. Existing Track Charts and Right of Way & Track Maps (valuation plans) and most recent bridge inspection reports were obtained with the cooperation of the Boston & Maine Corporation prior to field inspection. In addition, the Public Utilities Commission was contacted to identify and locate previous derailments.

All tracks were inspected for comparison to most recent F.R.A. (Federal Railroad Adminstration) Track Safety Standards for Class 1 & 2 rail freight traffic, 10 mph and 25 mph respectively. All defects observed were immediately brought to the attention of the B&M track supervisor accompanying the inspection team. Results of the field inspection were evaluated for conformance with applicable standards. Branch line rail traffic data was obtained from the B&M Corporation. Information received included yearly carload volumes and commodity types.

Finally, as a result of data collected and evaluation of inspection findings, recommendations were made as to the ability of the lines in question to carry rail freight traffic at F.R.A. Class 1 & 2 speeds.

*Designated Newington Branch for clarity.

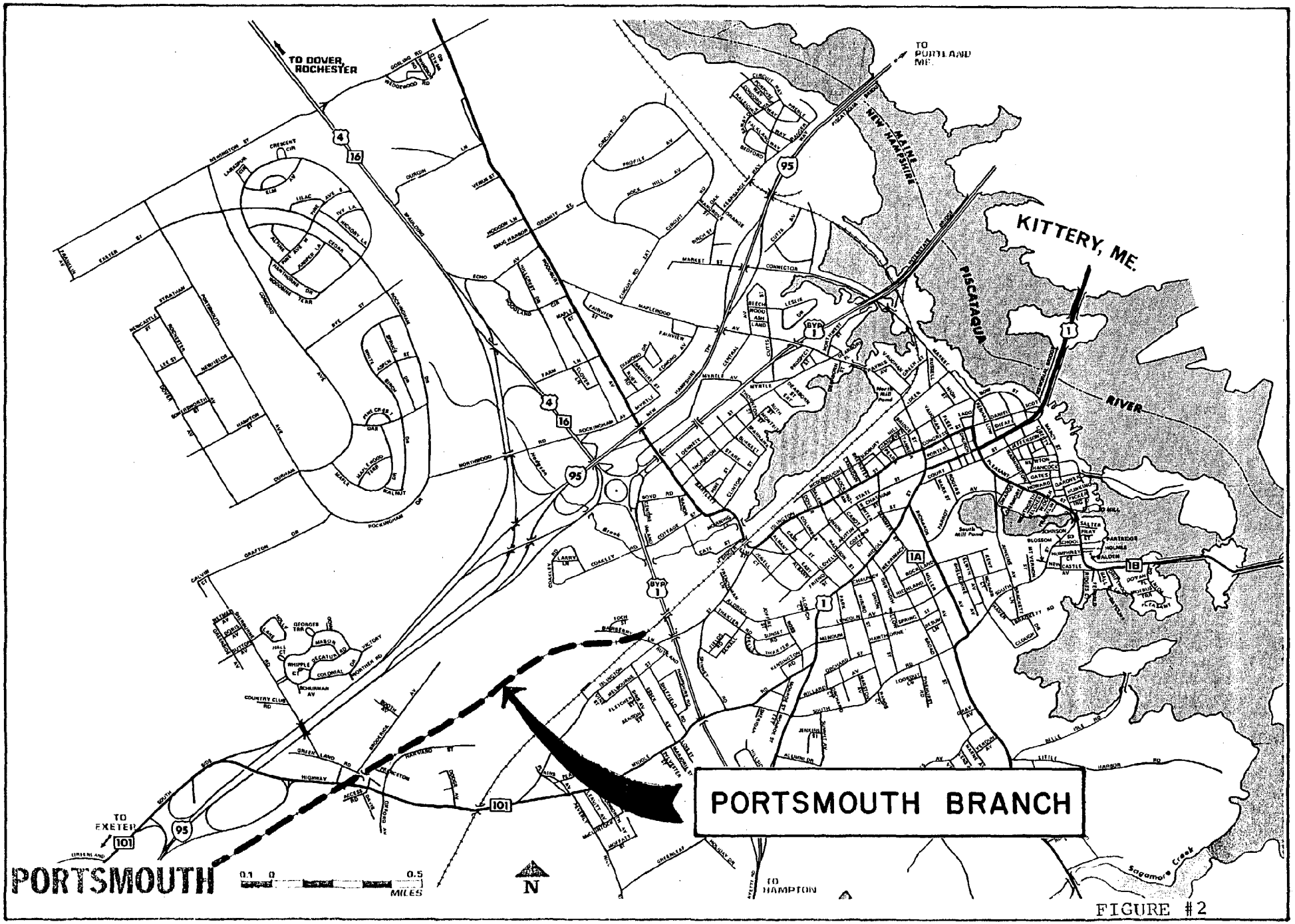

TO DOVER, ROCHESTER
TO PORTLAND ME.
NEW HAMPSHIRE
MAINE
KITTERY, ME.
PISCATAQUA
RIVER
PORTSMOUTH BRANCH
PORTSMOUTH
TO EXETER
TO HAMPTON
0.1 0 0.5
MILES
N

FIGURE #2

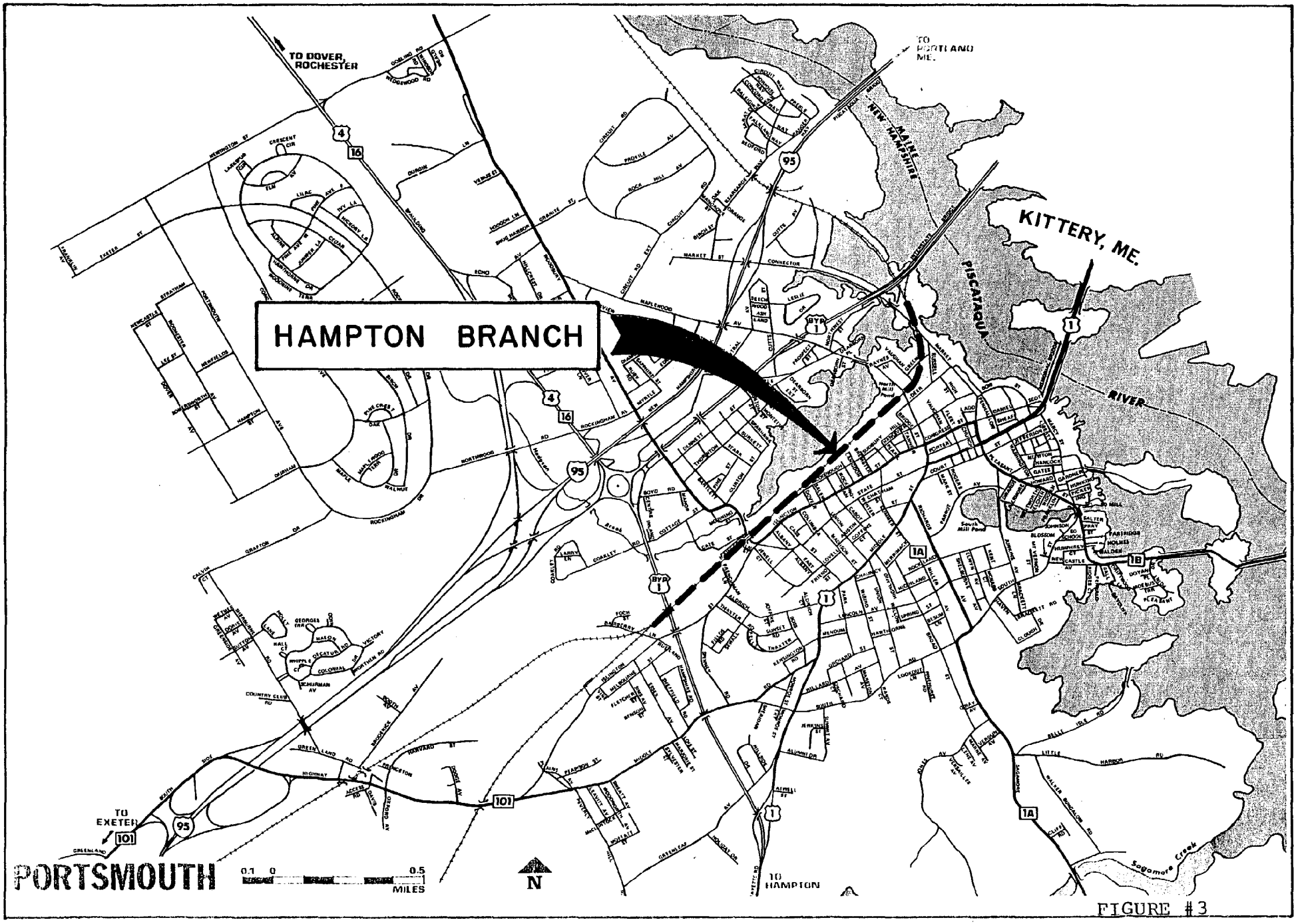

HAMPTON BRANCH
TO DOVER, ROCHESTER
TO PORTLAND ME.
KITTERY, ME.
PISCATAQUA RIVER
NEW HAMPSHIRE
MAINE
TO EXETER
PORTSMOUTH
TO HAMPTON
0.1 0 0.5
MILES
N

FIGURE #3

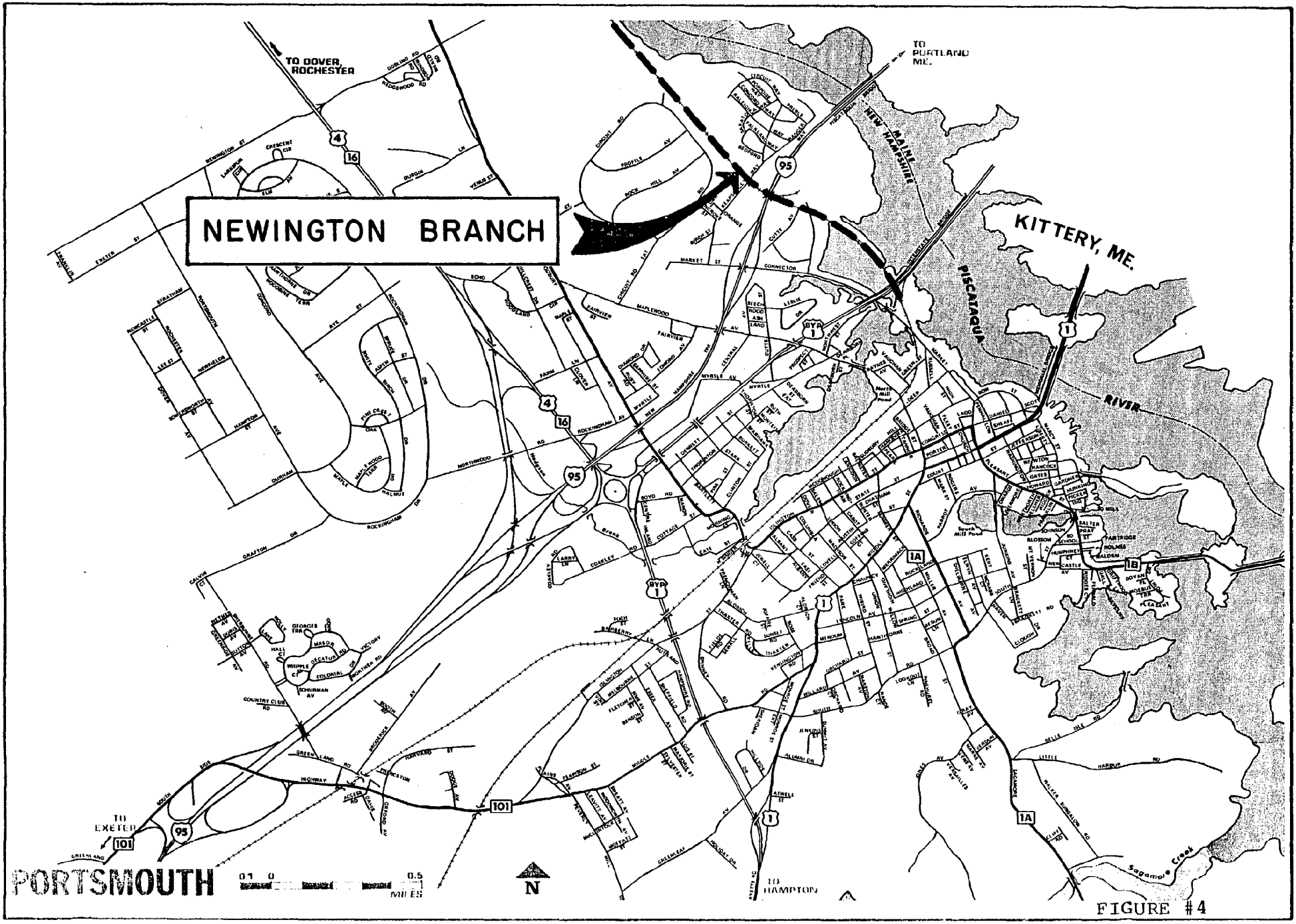

NEWINGTON BRANCH
TO DOVER, ROCHESTER
TO PORTLAND ME.
NEW HAMPSHIRE
MAINE
KITTERY, ME.
PISCATAQUA
RIVER
TO EXETER
PORTSMOUTH
TO HAMPTON
N
MILES
Sagamore Creek

FIGURE #4

IV. PHYSICAL PLANT ASSESSMENT

IV Physical Plant Assessment

Current Operations

Freight operations on the branch lines are performed by the Portsmouth Switcher, headquartered in the Portsmouth yard. Services are provided to consignees and shippers as required but are available five (5) days per week. Freight cars are dropped and picked up at Rockingham Junction by through freight trains on a daily basis, (see Figure No. 1). Currently, operations are regulated by F.R.A. Class 1 speeds (10 mph) as required by the P.U.C.

Operational Procedures

According to B&M officials, procedures followed for the movement of hazardous cargo are in conformance with Code of Federal Regulations 49 CFR 170-179, (Rev. November 1, 1983). Additional safety procedures are outlined in P.U.C. Docket DT 81-387, (not part of this report).

Derailment History

According to records at the Public Utilities Commission, there have been five (5) reported derailments since 1969. Derailments in the Portsmouth area are defined as, "one (1) wheel off the track and on the ground."

Derailment Summary

Year	Location
1969-1975	None reported
1975-1980	Files not found
1981	Cutts Avenue
1982	Emery Junction near Barberry Lane (3)
1983	Location not known
1984	No reports as of 9/10/84

V. INSPECTION

V Inspection

General

An inspection team from Andrews & Clark, Inc., performed a walking field inspection of the branch lines on October 15th through October 18th. An experienced rail inspector was in responsible charge at all times. During the inspection process, a Track Supervisor from the B&M Corporation accompanied the inspection team. Assisting Andrews & Clark, during the inspection, were Mr. Craig Wheeler and Mr. David Holden of the Portsmouth Planning Department.

Prior to the inspection, the Public Utilities Commission was contacted to identify and locate previous derailments with the intent of inspecting these locations for potential defects. In addition, the Portsmouth Fire Department was contacted as to their concerns.

Scope

Existing tracks were inspected with the intent of comparing field conditions to F.R.A. Regulations Part 213-Track Safety Standards for Class 1 and Class 2 Freight Trains. Essentially geometric features and track structure components inspected include but were not limited to:

- Acceptable ties per length of rail (39 ft.) (213.109)
- Gage (213.53)
- Rail end mismatch (213.115)
- Tangent and curved line deviation (213.55)
- Cross level deviation (213.57) thru (213.59)
- Rail joints (213.121)
- Rail fastenings (213.127)
- Defective rails (213.113)

Additional general observations made concerning track integrity were; rail weight, rail condition, drainage, vegetation, highway grade crossings, ballast condition and bridges.

Procedure

In order to accurately investigate track geometry and physical condition of track structure, the entire branch line

system under investigation was physically inspected on four (4) seperate occasions.

1. Initially all curves, ten (10) in all, were stationed and marked as a basis for string lining of track. Curve lengths varied from 400 to 2,500 feet.
2. With the cooperation of the B&M Corporation, a "High-rail Vehicle" was driven over the entire system at traveling speeds of 10-15 miles per hour. Rail ride was observed and a general photo log of the entire system was taken.
3. Cross level and gage was measured on all curves including inbound and outbound tangent sections for comparison against assumed design, super-elevation for deviation from F.R.A. Standards. Tangent portions of track were visually observed for gage and cross level deviation.
4. Finally the entire line was walked and inspected for physical surface defects such as crushed head, vertical split head, horizontal split head, broken bases, ordinary breaks, damaged rail and the like. Joint bars were inspected for cracks, breaks and proximity of both in reference to joint bolts. Joint bolts were counted for numbers of acceptable bolts per rail joint. Tie plates and spikes were observed for existance, general condition and position. Ties were assessed for condition according to F.R.A. Track Safety Standards.

Although superceded on September 7, 1982, F.R.A. Track Safety Standard Section 213.127 Track Spikes was used as a guide to determine adequacy of rail fastening, (current standards do not indicate minimum numbers of spikes by Class and location but is left to the discretion of the track inspector). Rail tie geometric location and Physical condition were also inspected. Each length of rail (39 feet) was evaluated for acceptable ties. F.R.A. Class 1 requires a minimum of five (5) acceptable ties per rail and Class 2 requires eight (8) acceptable ties per rail length. General criteria for defecting ties under Section 213.109 Crossties include:

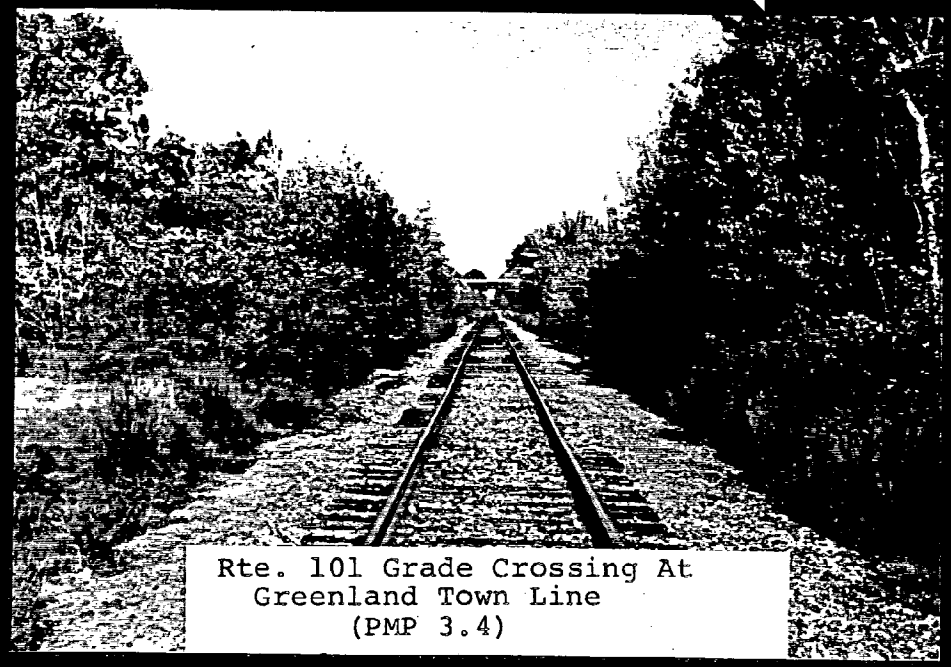
a) Broken through
b) Split
c) Deteriorated
d) Tie plate cut

In addition, rail joints were inspected for at least one (1)

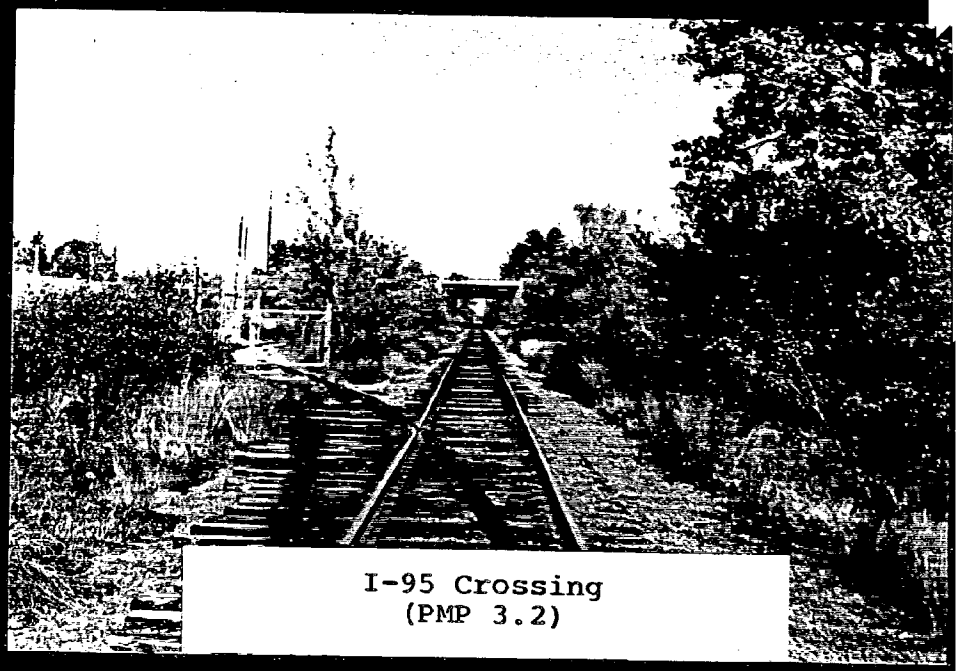
acceptable crosstie whose centerline is within 24 inches on either side of the centerline of joint, (see Appendix B for Class 1 & 2 comparison).

Rail Bridges

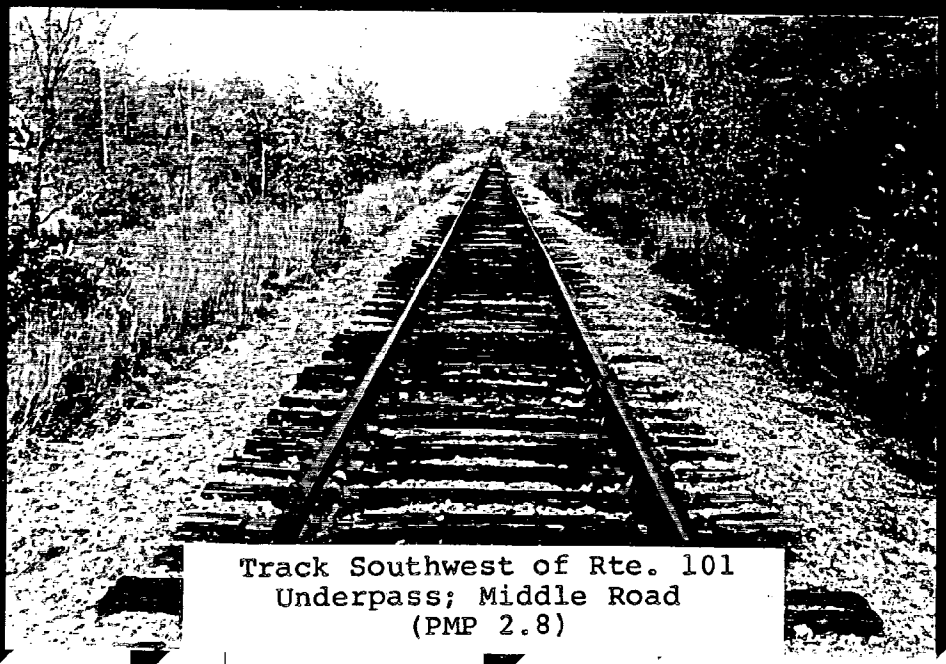
Inspection of existing rail bridges and grade separations are not included within the scope of the project. However, in an effort to present a comprehensive assessment of the rail lines investigated, most recent Bridge and Structure Inspection Reports of bridges on the line were obtained from the Boston & Maine Corporation, (see Appendix A).



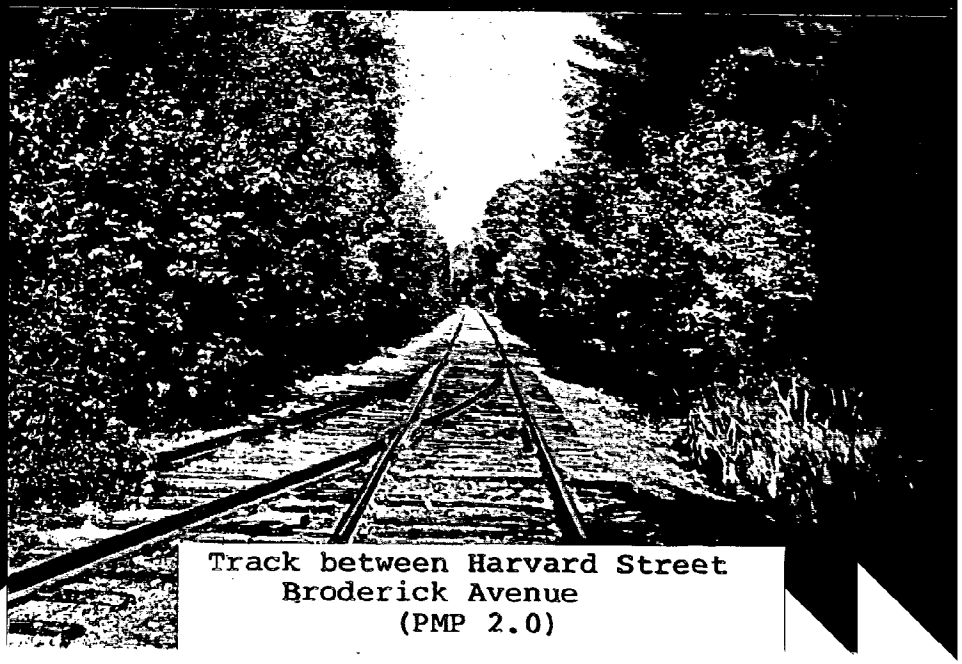
Rte. 101 Grade Crossing At
Greenland Town Line
(PMP 3.4)



I-95 Crossing
(PMP 3.2)



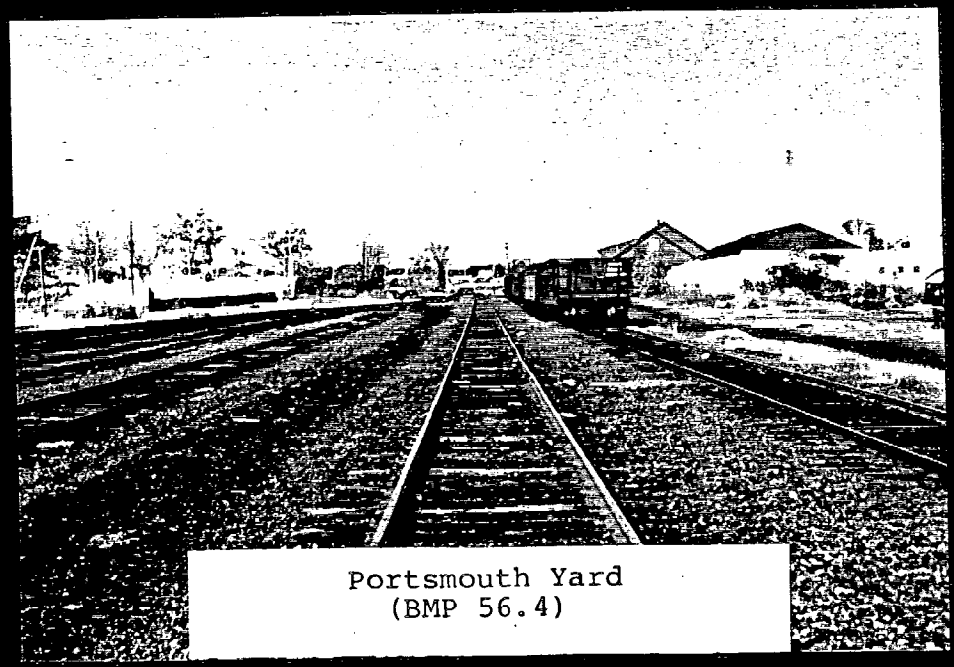
Track Southwest of Rte. 101
Underpass; Middle Road
(PMP 2.8)



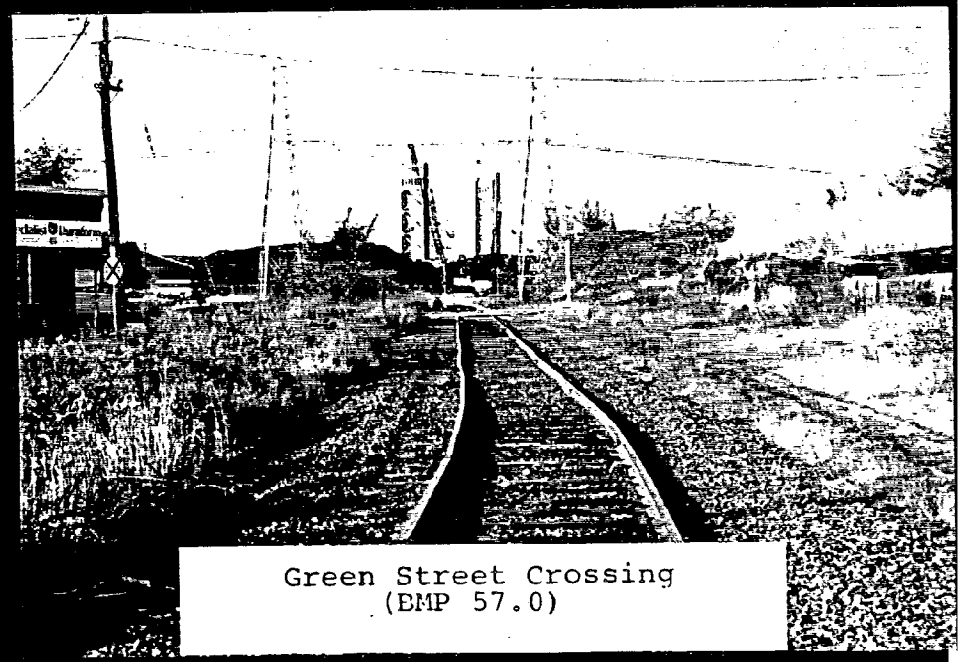
Track between Harvard Street
Broderick Avenue
(PMP 2.0)

Barberry Lane Grade Crossing
(PMP 1.1)

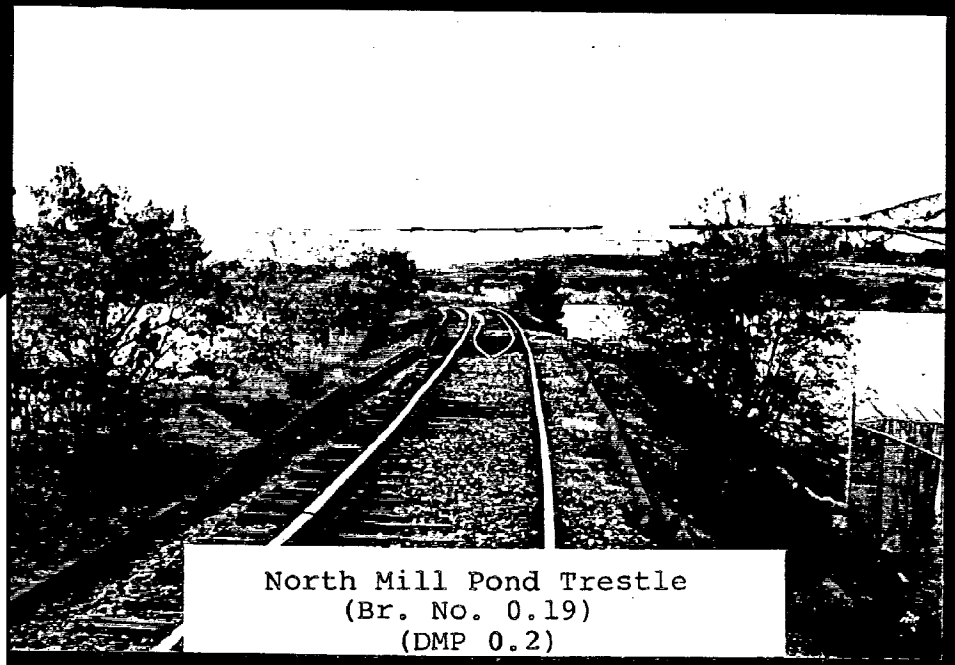
Bartlett Street Overhead
Crossing
(BMP 56.2)



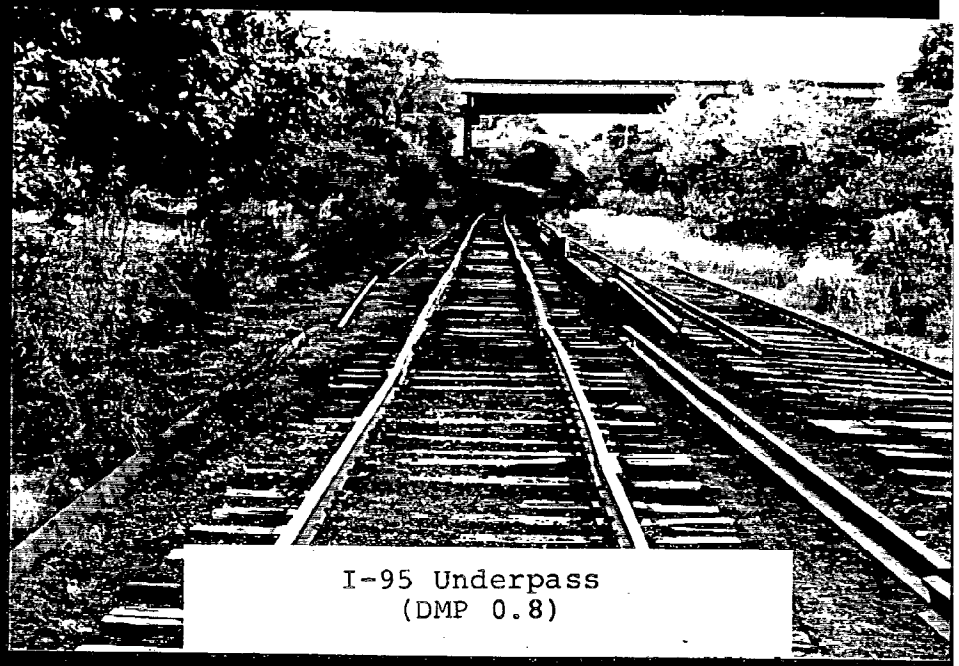
Portsmouth Yard
(BMP 56.4)



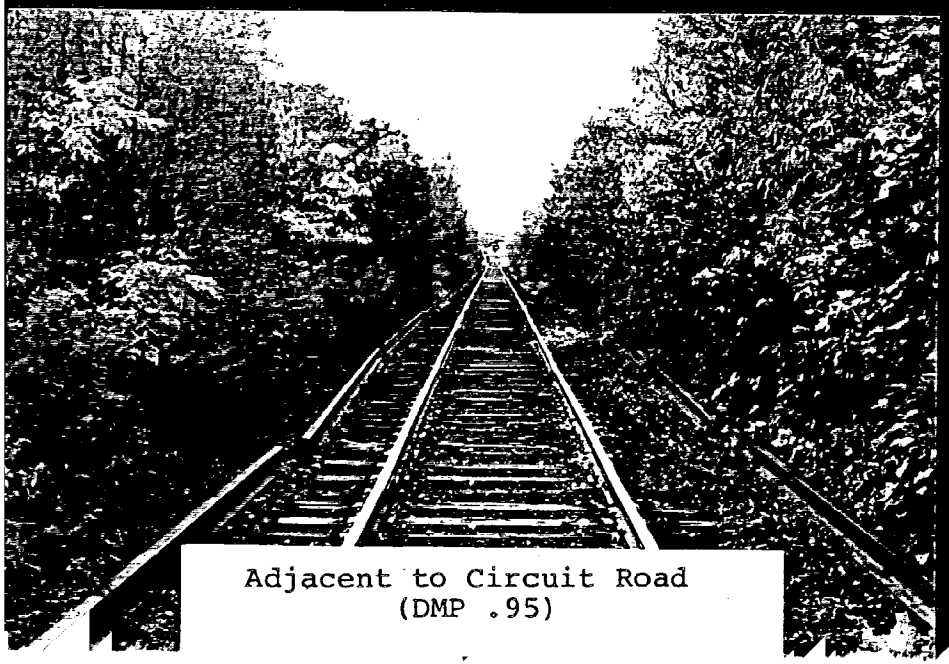
Green Street Crossing
(BMP 57.0)



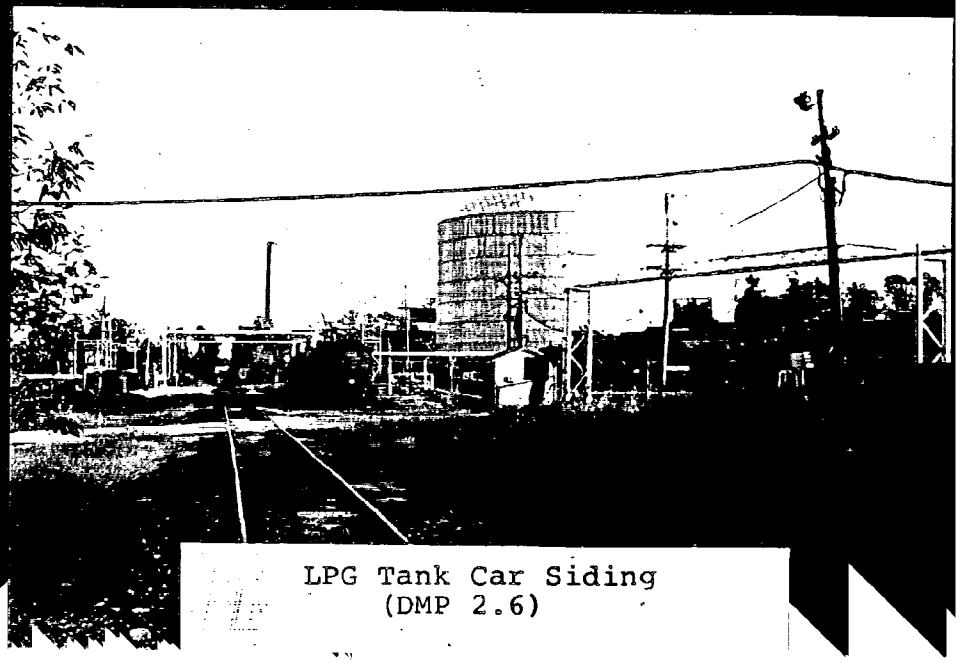
North Mill Pond Trestle
(Br. No. 0.19)
(DMP 0.2)



I-95 Underpass
(DMP 0.8)



Adjacent to Circuit Road
(DMP .95)



LPG Tank Car Siding
(DMP 2.6)

VI. FINDINGS

VI Findings

General

Results of the intensive four (4) day field inspection revealed track conditions at or above Class 2 standards for that portion of the Portsmouth and Hampton Branches within the study limits. In general, rail was 85 lb. throughout. Eight (8) track defects were found during the investigation.

Generally defects were in the track structure, ie. ties and rail joints. The Newington Branch, however, had numerous defects with many ties in rejectable condition. Isolated rail joint defects found were immediately fixed by B&M maintenance crews. The portion of the line north of Kearsarge Way appeared to be in the worst condition. At the time of inspection, Wednesday, October 17th, B&M track crews were observed in the area of Cutts Crossing and were replacing defective ties. It was also noted, at that time, that relay rail (130 lb.) and new ties were layed out north of Cutts Crossing and appeared to be in preparation for significant maintenance work. A larger maintenance crew was observed on the morning of October 18th, the last day of inspection. It is assumed that anticipated work on the line was to begin at that time.

Geometry

Evaluation of track geometry on the branch lines revealed no defects, (see Appendix B for gage and cross level inspection data for the ten (10) curves and approach tangent sections).

Track gage deviation from standard gage (4'-8½") varied from +1¼" to -½" but was within the limits for Class 1 and Class 2 track, (see Appendix C for comparison).

Cross level and alignment on tangent sections were visually checked with no defects observed. Existing Cross level super-elevations on curves were compared against F.R.A. standards with no defects found. There is potential for uneven tie loading and possible rail compression resulting from excessive super-elevation especially on sections of track where steep down grades occur at curves.

Track Structure

A total of eight (8) track structure defects were found and included defective ties, joint defects and fastening defects, (see Figure No.'s 5-7 for location). The track structure, North of Cutts Ave. where maintenance crews were encountered, was inspected in conjunction with the B&M track supervisor. Additional defects found were repaired at that time.

One (1) defect was located on the Portsmouth Branch east of the Hampton Line Junction, three (3) defects were found in the Portsmouth yard and four (4) defects were located on the Newington Branch north of Kearsarge Way.

General defects not necessarily dictated by Class 1 and Class 2 criteria were also found and are discussed under sections 213.33 and 213.37. On the Portsmouth Branch, south of the yard area, excessive vegetation such as brush and limbs encroach into the track area. The Newington Branch near Kearsarge Way and I-95 has a significant drainage problem. Although there has been an extreme dry spell in the region, standing water has been observed in drainage ditches. During winter months, areas such as this are usually susceptible to frost action especially if ballast is fouled. Excessive frost action can lead to geometric and rail structure defects.

Summary of Rail Defects
(10/15/84 - 10/18/84)

Defect No.	Valuation Map No.	Station (FRA Section)	Description
	V.28	STA. 85 + 70+ to STA. 138 + 60	
1		STA. 90 + 70+	Joint not supported. Shims are Split and have not been removed.
	V3 N.H. 55	STA. 2966 + 20 to STA. 3019 + 0	
2		STA. 2985 + 40+	Joint Defect - Defective Ties.
		(213.109(d))	Adjacent Ties at Joint Not Supporting Joint.
3		STA. 2991 + 60+	Same as above.
4		STA. 2994 + 40+	Joint bar broken & 1 bolt missing - OK for Class 1 Track. (Requires New Joint Bar & 1 Additional Bolt for Class 2 Track)
	V3 N.H. 56-A	STA. 0 + 00 to STA. 52 + 80	
5		STA. 45 + 00+	Broken Joint Bar.
		(213.121(c))	(Replaced Same Day)
6		STA. 49 + 20+	Joint Defect - Defective Ties.
		(213.109(d))	Adjacent Ties at Joint Not Supporting Joint. (Replaced next day)
	V3 N.H. 56-B	STA. 52 + 80 to STA. 105 + 60	
7		STA. 68 + 30+	Joint Defect - Defective Ties.
		(213.109(d))	Adjacent Ties at Joint Not Supporting Joint.
8		STA. 70 + 95+	Rail Fastenings
		(213.127) & (213.109(d))	No Rail Fastenings at Joint.

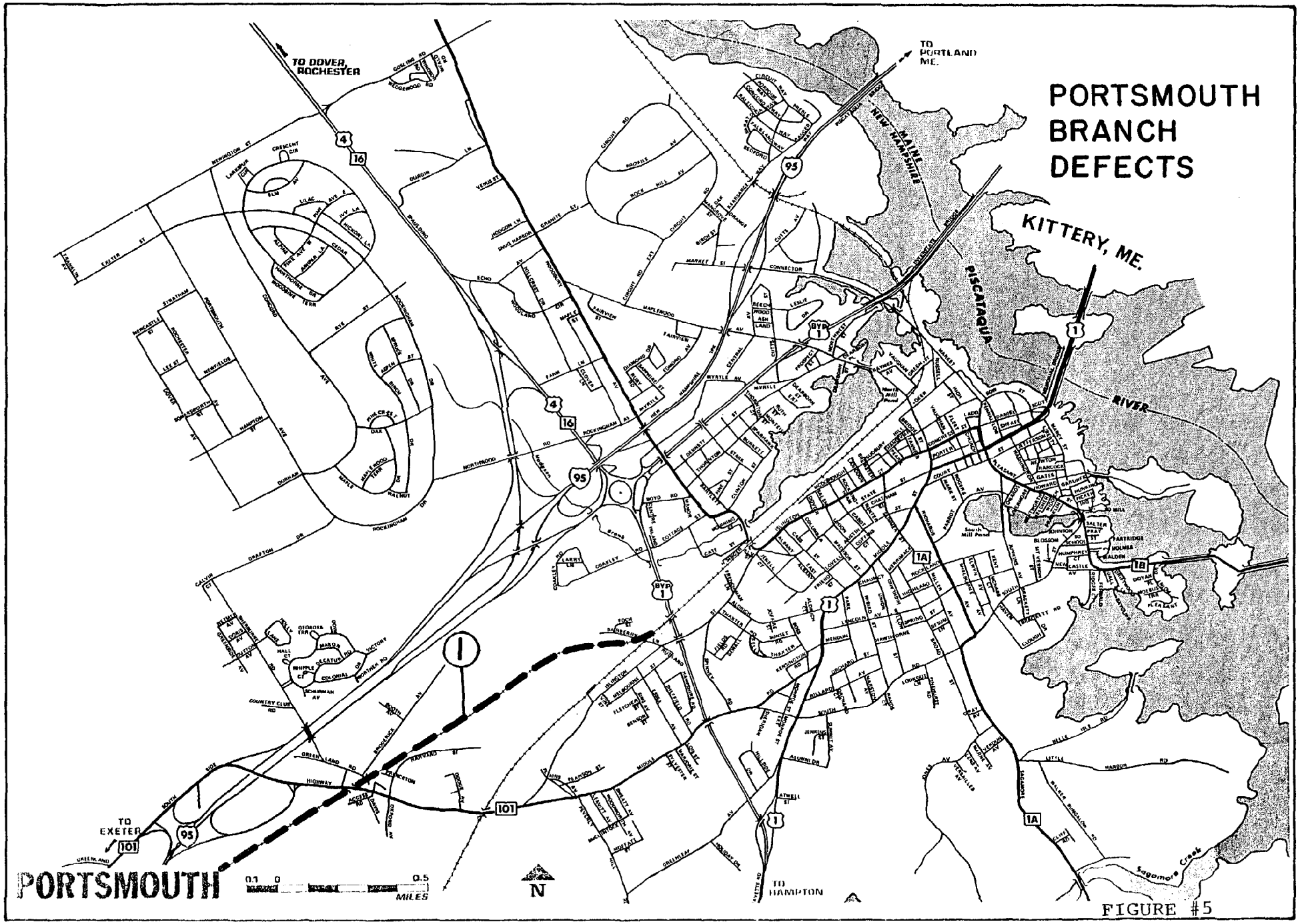

PORTSMOUTH
BRANCH
DEFECTS
TO DOVER, ROCHESTER
TO PORTLAND ME.
KITTERY, ME.
NEW HAMPSHIRE
MAINE
PISCATAQUA
RIVER
TO EXETER
PORTSMOUTH
TO HAMPTON
Sagamore Creek
0.1 0 0.5
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FIGURE #5

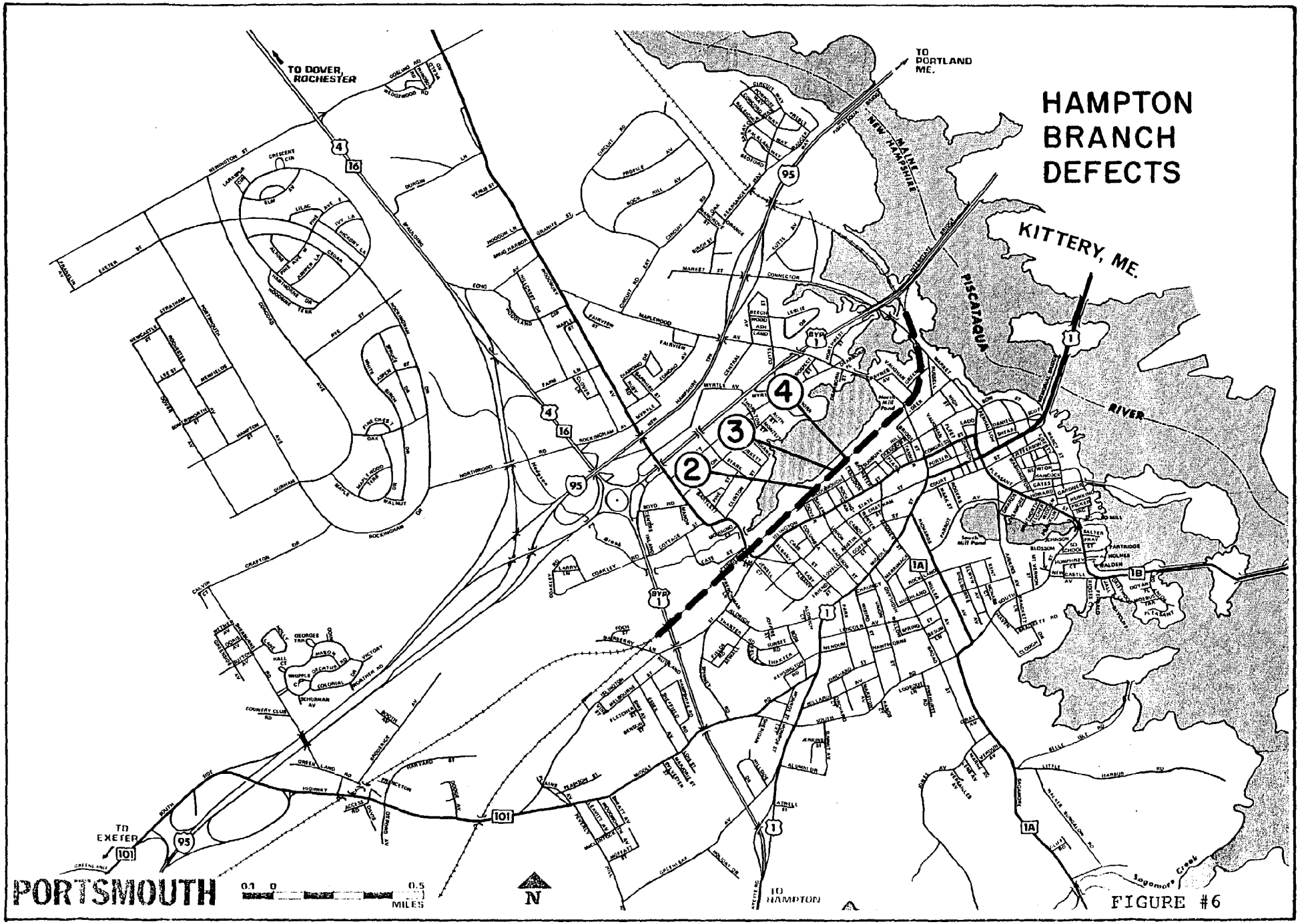
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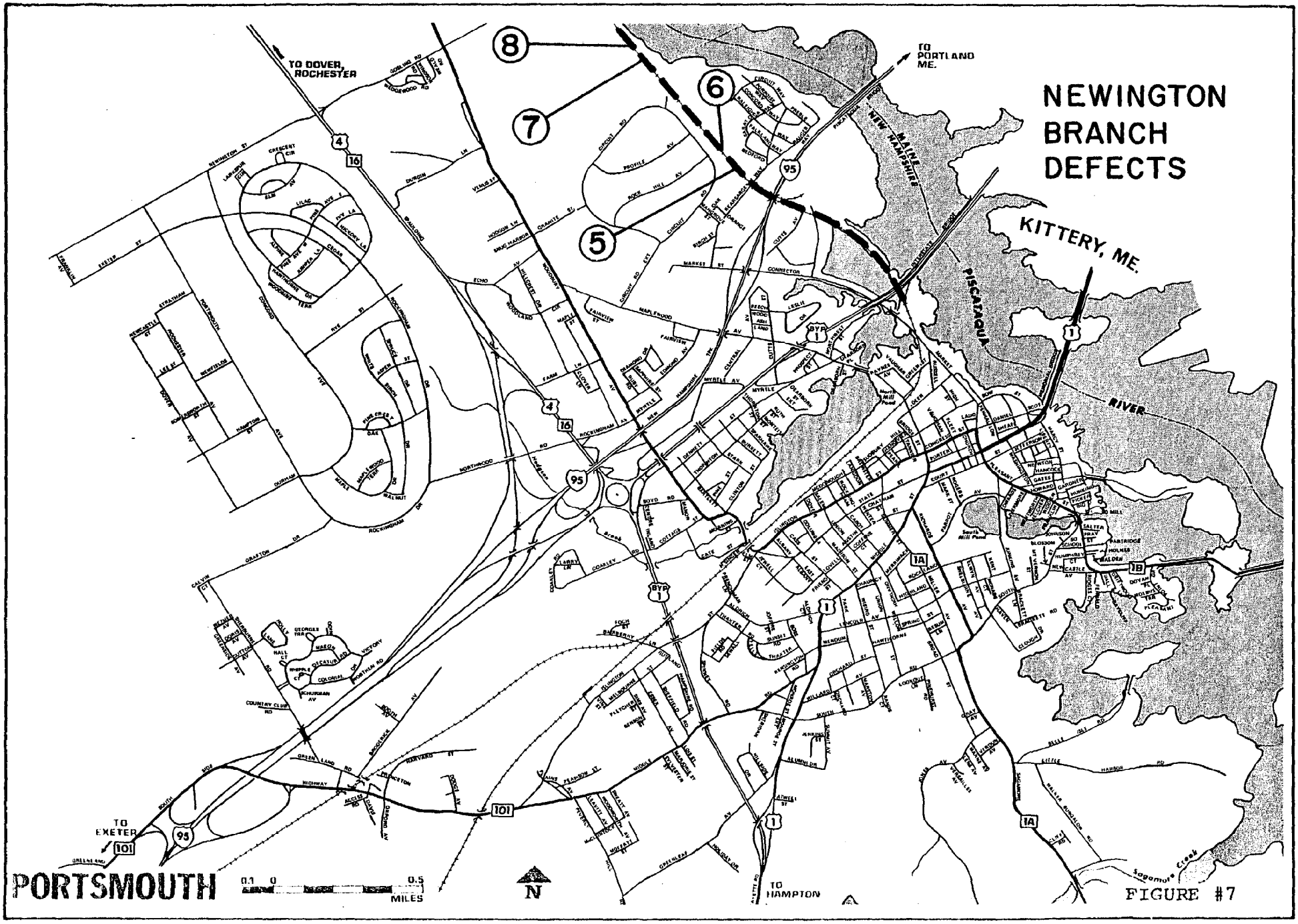
FIGURE #6


NEWINGTON
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Sagamore Creek
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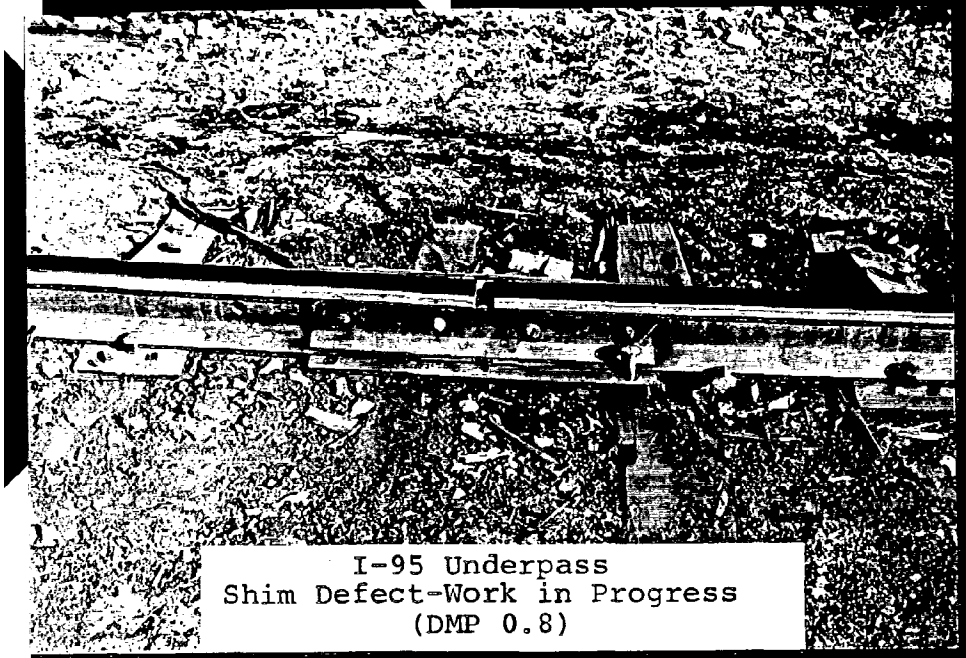
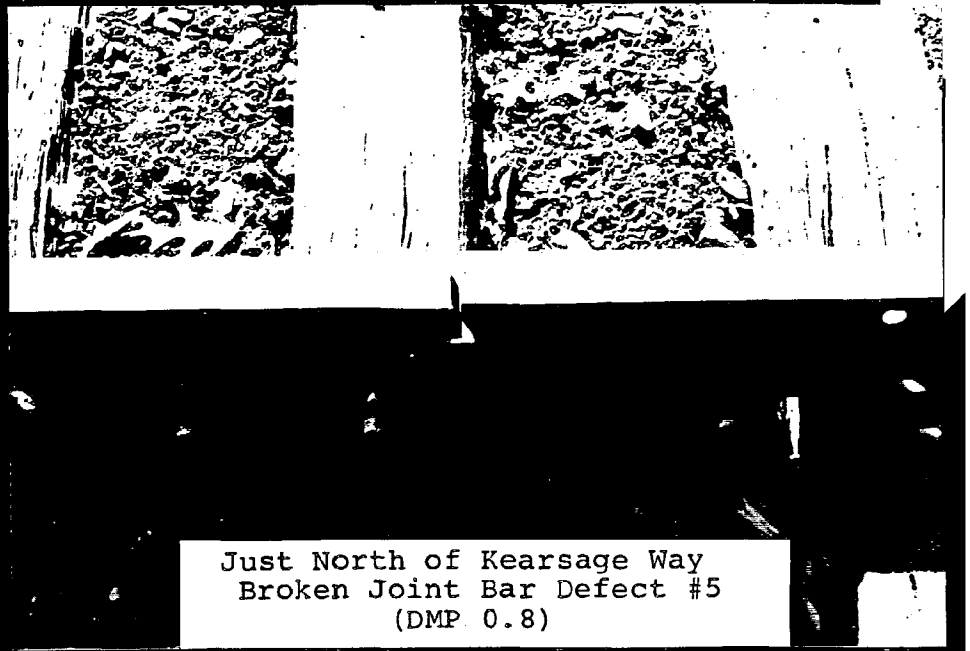
FIGURE #7



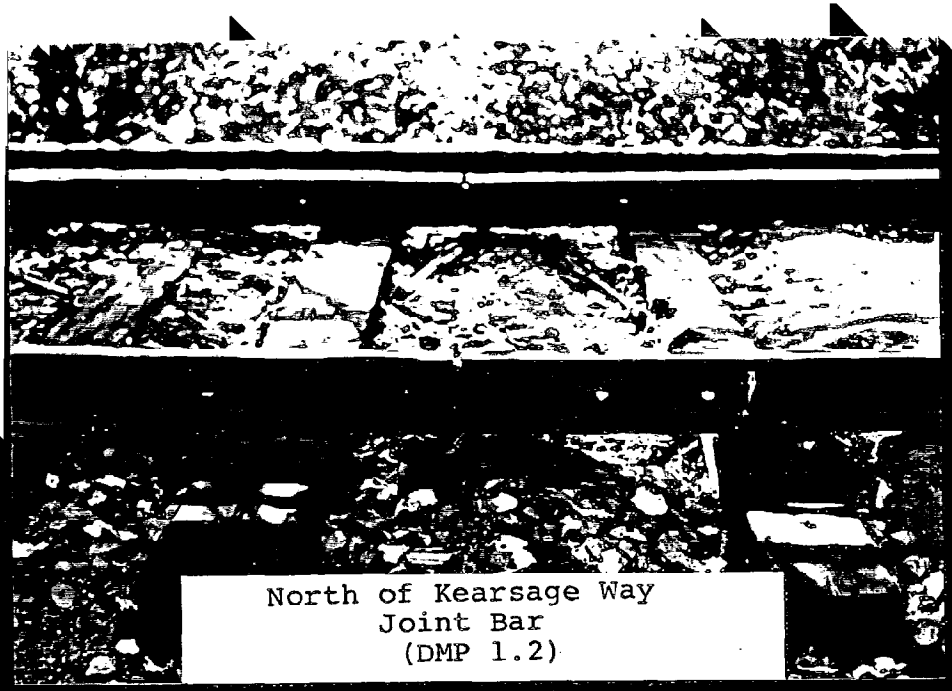
I-95 Underpass
Shim Defect-Work in Progress
(DMP 0.8)



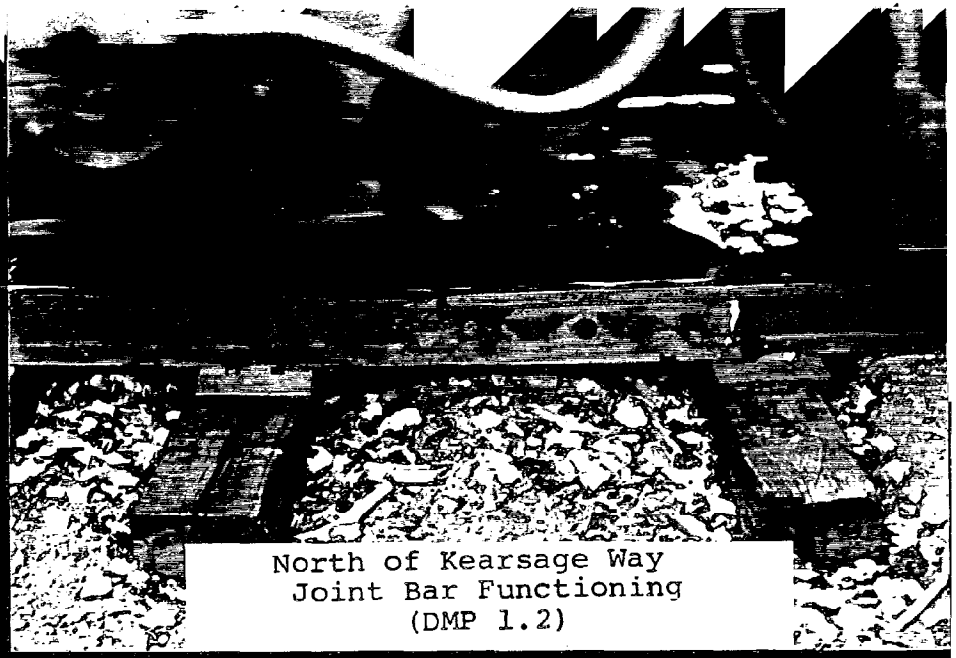
Just North of Kearsage Way
Broken Joint Bar Defect #5
(DMP 0.8)

Adjacent to Rock Hill Avenue
Joint Defect #6-Defective Ties
(DMP 0.9)

Adj. to Substation Circuit Rd.
Defect Marked to be Fixed by B&M
(DMP 1.2)

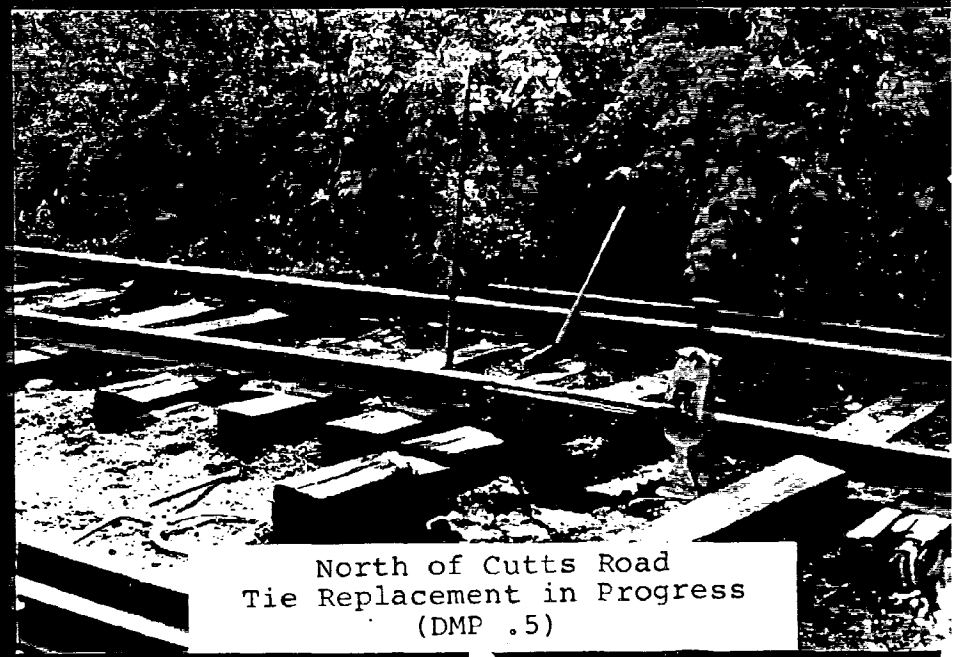


North of Kearsage Way
Joint Bar
(DMP 1.2)



North of Kearsage Way
Joint Bar Functioning
(DMP 1.2)

Adjacent to Brewster Street
Joint Defect #3-Defective Ties
(BMP 56.7)



North of Cutts Road
Tie Replacement in Progress
(DMP .5)

VII. RAIL TRAFFIC EVALUATION

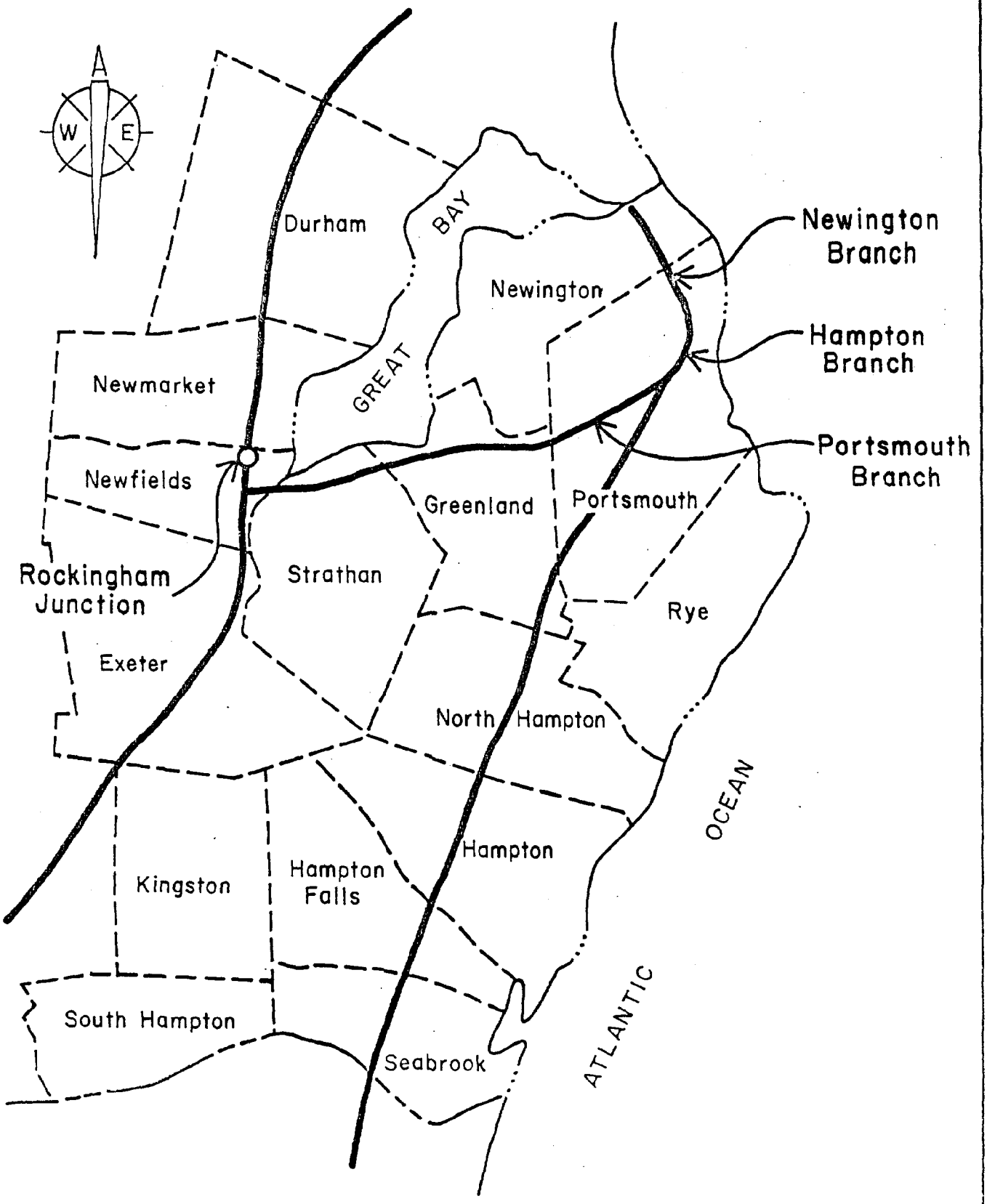
VII Rail Traffic Evaluation

Freight Traffic

Current Operations

Inbound and outbound rail freight traffic on the Portsmouth, Hampton and Newington Lines are picked up or dropped at Rockingham Junction by through trains on the Boston to Portland Line. Service on the branch lines is five (5) days per week or on demand and is handled by a Switcher operating out of Portsmouth station. Commodities shipped to and from the Newington Branch travel through downtown Portsmouth over the Hampton Branch then over the Portsmouth Branch to Rockingham Junction, (see Figure No. 8, Rail Traffic Plan).

Rail freight traffic volumes and corresponding commodity types are considered confidential information by the B&M Corporation. However, for general information, commodity types by percent of branch line volumes are presented in Exhibits 1-4 (pages 13-16) in order to reflect general commodity types and relationship of inbound to outbound traffic.



Rail Traffic Plan

FIGURE #8

ORIGIN and DESTINATION DATA - 1981
(Carloads to and from points on branch lines)

Branch	Commodity	Inbound	Outbound
Portsmouth	Paper	76%	--
	LPG	0%	--
	Beer	17%	--
	Misc.-Gen'l	7%	--
Hampton	Sand	69%	--
	Plastics	0%	--
	Lumber	17%	--
	Coal	1%	--
	Pulpboard	12%	100%
	*Navy Yard	1%	--
Newington	LPG	52%	72%
	Chemicals	32%	0%
	Plastic	12%	28%
	Tallow/Chemicals	4%	0%
Branch Line System Totals		2238	359

*Received at Portsmouth Station, unloaded on Hampton Branch

ORIGIN and DESTINATION DATA - 1982
(Carloads to and from points on branch lines)

Branch	Commodity	Inbound	Outbound
Portsmouth	Paper	78%	--
	LPG	1%	--
	Beer	10%	--
	Misc.-Gen'l	11%	--
Hampton	Sand	87%	--
	Plastics	1%	--
	Lumber	6%	--
	Coal	1%	--
	Pulpboard	4%	100%
	*Navy Yard	1%	--
Newington	LPG	49%	--
	Chemicals	45%	--
	Plastics	6%	100%
	Tallow/Chemicals	0%	--
Branch Line System Totals		4471	43

*Received at Portsmouth Station, unloaded on Hampton Branch

ORIGIN and DESTINATION DATA - 1983
(Carloads to and from points on branch lines)

Branch	Commodity	Inbound	Outbound
Portsmouth	Paper	72%	--
	LPG	1%	--
	Beer	12%	--
	Misc.-Gen'l	15%X	--
Hampton	Sand (Seabrook)	70%	9%
	Plastics	3%	--
	Lumber	15%	--
	Coal	1%	--
	Pulpboard	11%	91%
Newington	LPG	61%*	--
	Chemicals	26%	--
	Oil	1%	--
	Plastics	3%	--
	Tallow/Chemicals	9%	100%
Branch Line System Totals		3353	74

*Spot export move (one time shipment)
XCars unloaded at Saxonville lumber on Hampton Branch

ORIGIN and DESTINATION DATA - 1984, 1st 6 months
(carloads to and from points on branch line)

Branch	Commodity	Inbound	Outbound
Portsmouth	Paper	74%	--
	Beer	15%	--
	Misc.-Gen'l	11%	--
Hampton	Sand	1%	--
	Plastics	12%	--
	Lumber	41%	--
	Coal	4%	--
	Pulpboard	36%	100%
	*Navy Yard	6%	--
Newington	Chemicals	64%	--
	Tallow/Chemicals	36%	100%
Branch Line System Total (6 months)		766	42

*Received at Portsmouth Station, unloaded on Hampton Branch

VIII. RECOMMENDATIONS

VIII Recommendations

General

As a result of the physical plant assessment including physical condition and geometry, certain deficiencies were found. Specific defects such as gage variation and insufficient ties per length of rail were assessed relative to F.R.A. Class 1 and Class 2 requirements. Other deficiencies such as drainage and vegitation are considered general in nature and are not compared to class of track, recommendations are presented accordingly.

In addition to recommendations by Class of track set forth in Chart No. 1 (next page), it is also recommended that the portion of the Newington Branch under maintenance work during the initial inspection be reinspected following the setting of the 130 lb. rail. Two curves (#4 & #5) were found to deviate geometrically from acceptable limits, (see Appendix C). Both are located in the Portsmouth Yard Limits and are controlled by Class 1 speeds. It is recommended that the entire system, including these sections, be analyzed by a track mounted rail geometry vehicle. Although this procedure is not required by F.R.A. regulations, it is considered to be a prudent measure.

A summary of Class Limitations is also provided as a comparison of controlling criteria by class.

RECOMMENDATIONS
by
Branch Line and Class

Branch Line	F.R.A. Class 1 (10 mph)	F.R.A. Class 2 (25 mph)	General	Comments
Portsmouth Branch	Repair Defect #1 (Joint Support)	Same	Remove Brush	Defect No. 1 to be repaired by B&M.
Hampton Branch	Repair Defect No.'s 2 & 3	Repair Defect No.'s 2, 3, & 4		Defects 2, 3 & 4 to be repaired by B&M.
Newington Branch	Repair Defect No.'s 5,6,7 & 8	Replace Approximately 1,000 ties	1. Remove Brush 2. Investigate drainage near I-95	1. Defects 5,6,7 & 8 to be repaired by B&M. 2. Rail being replaced with 130 lb. rail by B&M. 3. Ties marked defective by B&M being replaced.

Chart No. 1

Summary of
Class Limitations
(assuming observed defects are fixed)

Restricting Condition / Branch Line	Physical Plant			Geometry			Operational			Controlling Class
	Ties	Spikes	Joints	Curve Line	Super Elevation	Gage	Within Yard Limits	Grade Crossing	Within Yard Limits	
Portsmouth										
Curve No. 1	2	2	2	3	3	3	--	--	3	2
Curve No. 2	2	2	2	2	2	2	2	--	--	2
Curve No. 3	2	2	2	2	2	2	2	2	--	2
Hampton										
Curve No. 4	2	2	2	1	1	1	1	1	--	1
Curve No. 5	2	2	2	1	1	1	1	1	--	1
Newington										
Curve No. 6	2	2	2	1	1	1	1	1	--	1
Curve No. 7	2	2	2	1	1	1	1	1	--	1
Curve No. 8	1	2	2	1	1	1	1	--	--	1
Curve No. 9	1	2	2	1	1	1	1	1	--	1
Curve No. 10	1	2	2	1	1	1	1	1	--	1

Chart No. 2

APPENDIX A

BOSTON AND MAINE CORPORATION
BRIDGE AND STRUCTURE INSPECTION REPORT

BM 406
EB177

BOSTON AND MAINE CORPORATION - DEBTOR

ROBERT W. MESERVE, BENJAMIN H. LACY - TRUSTEES

SUPP. ATT. [ ]

BRIDGE AND STRUCTURE INSPECTION REPORT

No. 55 83

SPAN NO. 172 of 2

DATE 4-21-83 SHEET NO.

INSP. AREA ☑ 1 ☐ 2

LINE: M.L.E. R.R.

STATION: PORTSMOUTH, N.H.

NAME: WEST. ROAD OVER HIGHWAY

✓	ML
	BR
	ST

CLASS OF INSPECTION

V	✓ C	A	D	J	JC

TYPE OF SPAN

TRK 4	OH	HWY	FOOT	COND	SIG
SA	BA	TH	OTHER		

STEEL ✓	CONCRETE	TIMBER	CULVERT
IB	RCS	WS	BOX
DPG	RCA	KWS	PIPE
TPG	CA	TRS	RC
TRT	RCB	TWT	STN
DRT	COMP	DWT	PC
RPT	CRF	ODT	RCP
VIAD	RSCS	BDT	VCP
TPCT	PSCST	FRT	CIP
DPCT		WLT	CMP
SRF			SLP
			RT

CONDITION OF STRUCTURE (IF NOT GOOD, GIVE DETAILS)

MEMBER	G	F	P	DETAILS OF DEPRECIATION
RAILS				
RAIL FASTENINGS				
TIES - OPEN DECK				
WALKWAYS				
SPACERS				
BALLAST DECK TIMBER CONC.				
STEEL PLATE FLOOR	✓			
STRINGERS				
STRINGER CONN.				
FLOORBEAMS	✓			
F. BEAM CONN.				
KNEE BRACES				
GIRDERS - TOP FLANGE	✓			
" - BOTT. "	✓			
" - WEB	✓			
VIAD. BENTS - TOWERS				
TRUSSES - TOP CHORD				
" - BOTT "				
" - DIAGONALS				
" - END POSTS				
" - JOINTS				
BRACING - TOP				
" - BOTTOM	✓			
" - SWAY				
BEARINGS - FIXED	✓			
" - EXPANSION	✓			
MASONRY - PIERS	✓			CONC DIS SLIGHT UNDER G4
" - ABUTS.	✓			
" - PARAPETS	✓			
" - WINGS				
SLOPE - COVER STONES				
TIMBER CAPS				
" SILLS				
POSTS or PILES				
WALL PLATE				
PAINT	✓			
TELLTALES				
FENCES				
[illegible]				

IMMEDIATE REPAIRS REQUIRED.

REMARKS: APPROACHES GOOD.

GUARD RAIL & MARKER GOOD

OH POSTED . . . TONS SIGN: NSC 10 20

SIGNS: GO FO PO LEGIBLE YES NO

STAMP

INSP. BY: R.S. Parthasarathy
BR INSPECTOR

REPORT EXAMINED
SUPERVISOR BR. & BLDG'S.

REPORT REVIEWED
ENG'R OF STRUCTURES

BOSTON AND MAINE CORPORATION - DEBTOR
ROBERT W. MESERVE, BENJAMIN H. LACY - TRUSTEES

SB 406
EB177

SUPP. ATT. [ ]

BRIDGE AND STRUCTURE INSPECTION REPORT

No. 56 | 19

SPAN NO. .. 1 ..... of 1 .....
DATE .. 4-21-83 .. SHEET NO. .....
INSP. AREA ☒1 ☐2

LINE: ....M.E.E. Rte. (Hampton Branch)
STATION: Portsmouth., N.H.
NAME.. Barnet St. (Cor. Woodbury Ave.)

✓	
	ML
	BR
	ST

CLASS OF INSPECTION

V	✓ C	A	D	J	JC

TYPE OF SPAN

TRK	✓ OH	HWY	FOOT	COND	SIG
SA	BA	TH	OTHER		

STEEL	✓ CONCRETE	TIMBER	CULVERT
IB	RCS	WS	BOX
DPG	RCA	KWS	PIPE
TPG	✓ CA	TRS	RC
TRT	RCB	TWT	STN
DRT	COMP	DWT	PC
RPT	CRF	ODT	RCP
VIAD	RSCS	BDT	VCP
TPCT	PSCST	FRT	CIP
DPCT		WLT	CMP
SRF			SLP
			RT

CONDITION OF STRUCTURE (IF NOT GOOD, GIVE DETAILS)

MEMBER	G	F	P	DETAILS OF DEPRECIATION
RAILS				
RAIL FASTENINGS				
TIES - OPEN DECK	✓	✓		8 FAIR, ALL CHECKED (8"x8"x11")
WALKWAYS				
SPACERS	✓			CHECKED
BALLAST DECK TIMBER CONC.				
STEEL PLATE FLOOR				
STRINGERS	✓			
STRINGER CONN.	✓			
FLOORBEAMS	✓			
FL. CONN.	✓			
KNEE BRACES				
GIRDERS - TOP FLANGE	✓			
" - BOTT. "	✓			G1 BOTTOM FLANGE BENT UP 1" AT PAN-
" - WEB	✓			NEL 2.4 IS 1¼" UP OFF EAST BEARING,
END., BENTS - TOWERS				WEB HAS A 8" WIDE x 3" HIGH
TRUSSES - TOP CHORD				THREE CORNER TARE 2" ABOVE
" - BOTT. "				BOTTOM FLANGE ANGLE IN PAN 2
" - DIAGONALS				
" - END POSTS				
" - JOINTS				
BRACING - TOP				
" - BOTTOM	✓			
" - SWAY				
BEARINGS - FIXED	✓			
" - EXPANSION	✓			
MASONRY - PIERS				
" - ABUTS.	✓			
" - PARAPETS	✓	✓		EAST PARAPET STONES HARD
" - WINGS	✓			AGAINST GIRDERS & STRS.
CAP - COVER STONES				WEST PARAPET HARD AGAINST
TIMBER CAPS				G2 & G3.
" SILLS				
POSTS or PILES				
WALL PLATE				
BENT		✓	✓	
WING TALES				
FENCES				
LINE	✓			BOTH RAILS ARE ABOUT ½" NORTH.

IMMEDIATE REPAIRS REQUIRED:

REMARKS: APPROACHES NOW

GUARD RAIL & MARKER ARE GOOD.

OH POSTED . . TONS SIGN: NSO 10 20

SIGNS: GO FO PO LEGIBLE YES NOO

STAMP

INSP. BY: R.S. Bathelt
BR INSPECTOR

REPORT EXAMINED: .....
SUPERVISOR BR & BLDG'S

REPORT REVIEWED: .....
ENG'R OF STRUCTURES

BR 406
EB177

BOSTON AND MAINE CORPORATION - DEBTOR

ROBERT W. MESERVE, BENJAMIN H. LACY - TRUSTEES

SUPP. ATT. [ ]

BRIDGE AND STRUCTURE INSPECTION REPORT

No. 57 | 23

SPAN NO. 1-10 of 10

DATE 4-21-83 SHEET NO.

INSP. AREA ☑1 ☐2

LINE: M.E. RTE (Navy Yard Branch)

STATION: Portsmouth, N.H.

NAME: Piscataqua River

ML	BR	ST
✓		

CLASS OF INSPECTION

V	C	A	D	J	JC
	✓				

TYPE OF SPAN

TRK	OH	HWY	FOOT	COND	SIG
✓					

SA	BA	TH	OTHER

STEEL	CONCRETE	TIMBER	CULVERT
IB	RCS	WS	BOX
DPG ✓	RCA	KWS	PIPE
TPG	CA	TRS	RC
TRT ✓	RCB	TWT	STN
DRT	COMP	DWT	PC
RPT	CRF	ODT	RCP
VIAD	RSCS	BDT	VCP
TPCT	PSCST	FRT	CIP
DPCT		WLT	CMP
SRF			SLP
			RT

CONDITION OF STRUCTURE (IF NOT GOOD, GIVE DETAILS)

MEMBER	G	F	P	DETAILS OF DEPRECIATION
RAILS				
RAIL FASTENINGS				6 POOR 6"x8"x10'
TIES - OPEN DECK	✓	✓	✓	37 POOR 8"x12"x10'
WALKWAYS	✓	✓	✓	55 POOR 8"x12"@x12'
SPACERS	✓			CHECKED, 5 PCS 2"x8"x16' POOR
BALLAST DECK TIMBER CONC.				
STEEL PLATE FLOOR				
STRINGERS	✓			
STRINGER CONN.	✓			
FLOORBEAMS	✓			
FB CONN	✓			
KNEE BRACES	✓			
GIRDERS - TOP FLANGE	✓			
" - BOTT. "	✓			
" - WEB	✓			
VIAD. BENTS - TOWERS	✓			
TRUSSES - TOP CHORD	✓			
" - BOTT. "	✓			
" - DIAGONALS	✓			
" - END POSTS	✓			
" - JOINTS	✓			
BRACING - TOP	✓			
" - BOTTOM	✓			
" - SWAY	✓			
BEARINGS - FIXED	✓			
" - EXPANSION	✓			
MASONRY - PIERS	✓			
" - ABUTS	✓			
" - PARAPETS	✓	✓		
" - WINGS	✓			
SLAB - COVER STONES				
TIMBER CAPS				
" SILLS				
POSTS or PILES				
WALL PLATE				
PAINT	✓			
TAILS TALES				
FENCES ON SAFTEY PLATFORMS	✓	✓	✓	3 POOR 2"x6"x4'8" TOP RAILS MISSING
LINE	✓			ONE BOTTOM RAIL LOOSE. MANY 4"x6"x
				4'9" POSTS SPLIT, 6 BOARDS. TWO 3/4"x6"
				BOLTS CORRODED THRU ON BACKBRACES.

IMMEDIATE REPAIRS REQUIRED:

WALKS & FENCES

REMARKS:

GUARD RAIL GOOD, NO MARKER

OH POSTED ... TONS SIGN NSO 10 20

SIGNS: GO FO PO LEGIBLE YES NO

STAMP

INSP. BY: R.S. Parkhurst
BR INSPECTOR

REPORT EXAMINED:
SUPERVISOR BR. & BLDG'S.

REPORT REVIEWED:
ENG'R OF STRUCTURES

BOSTON AND MAINE CORPORATION - DEBTOR

ROBERT W. MESERVE, BENJAMIN H. LACY - TRUSTEES

BR 406 EB177

SUPP. ATT. [ ]

BRIDGE AND STRUCTURE INSPECTION REPORT

No. 019

SPAN NO. 1-B of B

DATE 6-2-83 SHEET NO.

INSP. AREA ☐1 ☐2

LINE: DOVER

STATION: PORTSMOUTH, NH.

NAME HAMS' FLATS

	BAL
✓	BR
	ST

CLASS OF INSPECTION

V	4C	A	D	I	IC

CONDITION OF STRUCTURE (IF NOT GOOD, GIVE DETAILS)

MEMBER	G	F	P	DETAILS OF DEPRECIATION
RAILS				
L FASTENINGS				
S - OPEN DECK	✓	✓		3 FAIR 6"x8"x12'
WALKWAYS				
ACERS	✓			
LAST DECK TIMBER CONC.				
STEEL PLATE FLOOR				
RINGERS	✓			STR'S FOOR 1" TOP OVER BENT 3
RINGER CONN.				
FLOORBEAMS				
B. CONN.				
EE BRACES				
GIRDERS - TOP FLANGE				
" - BOTT. "				
" - WEB				
VIAD., BENTS - TOWERS				
USSES - TOP CHORD				
" - BOTT. "				
" - DIAGONALS				
" - END POSTS				
" - JOINTS				
BRACING - TOP				
" - BOTTOM				
" - SWAY	✓			NO LOW WATER GUSTS
BEARINGS - FIXED				
" - EXPANSION				
MASONRY - PIERS				
TIMBER	✓		✓	E. NEW W. POOR
" - PARAPETS, Abutments				
" - WINGS				
SLAB - COVER STONES				
BER CAPS	✓			SEVERAL PCS OF BLOCKING
" SILLS				SPLIT BETWEEN BENTS 3 AND
PILES	✓			AND BENTS 4 A+B
LL PLATE				
PAINT				SEE COMP INSP 11-81
LL TALES				
NCES				
LINE		✓		W. APPR. 2"± S.
				E. APPR VERY LOW

TYPE OF SPAN

TRK	4	OH		HWY		FOOT		COND		SIG	
SA		BA		TH		OTHER					

STEEL	4	CONCRETE		TIMBER	1	CULVERT	
IB		RCS		WS		BOX	
DPG		RCA		KWS		PIPE	
TPG		CA		TRS		RC	
TRT		RCB		TWT		STN	
DRT		COMP		DWT		PC	
RPT		CRF		ODT	✓	RCP	
VIAD		RSCS		BDT		VCP	
TPCT		PSCST		FRT		CIP	
DPCT				WLT		CMP	
SRF						SLP	
						RT	

IMMEDIATE REPAIRS REQUIRED:

REPLACE GUARD RAIL
REPAIR W. BACKWALL
REPLACE W. APPROACH
TAMP E. APPR

REMARKS: MOST OF GUARD RAIL IS MISSING,

NO MARKER

OH POSTED . . . TONS SIGN. NSO 10 20

SIGNS: GO FO PO LEGIBLE YES NOO

STAMP

INSP. BY: R. S. Pickett
BR. INSPECTOR

REPORT EXAMINED: . . . .
SUPERVISOR BR. & BLDG'S.

REPORT REVIEWED: . . . .
ENG'R OF STRUCTURES

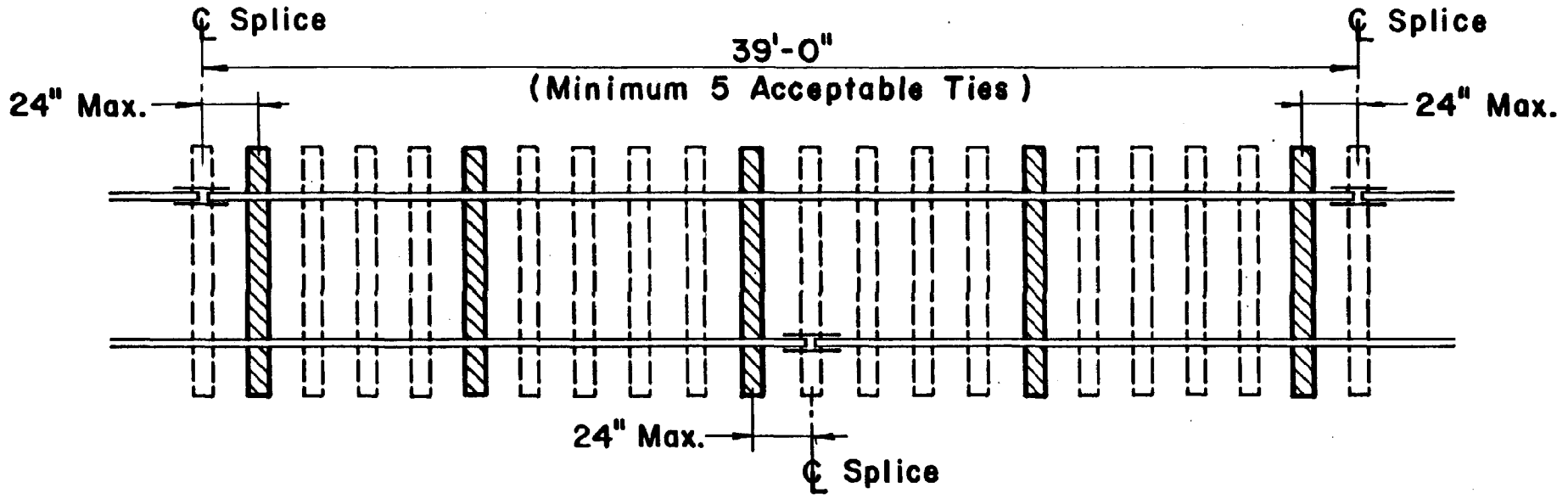
APPENDIX B

CLASS 1 & 2 COMPARISON

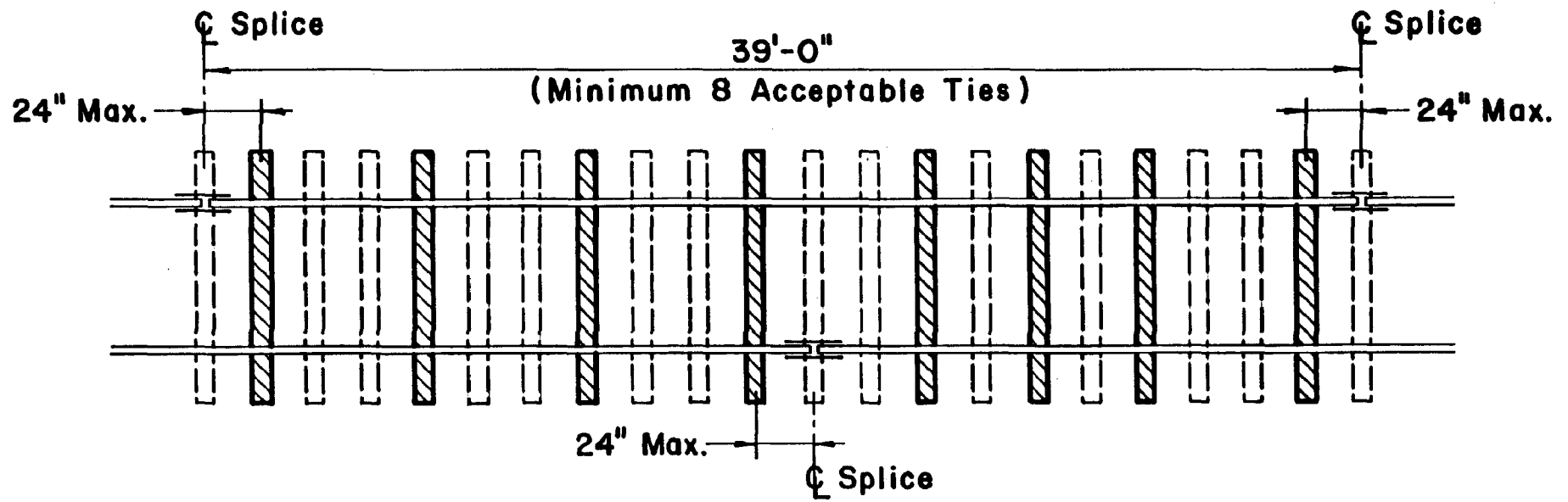
Class 1 & 2 Comparison

	Class 1 (10 mph)	Class 2 (25 mph)
Minimum Ties/39 ft.	5	8
Gage (4'-8½")	4'-8" (min.) 4'-10" (max.)	4'-8" (min.) 4'-9 3/4" (max.)
Rail End Mismatch	¼" (gage side) ¼" (tread)	3/16" (gage side) ¼" (tread)
Tangent Deviation	5"/62 ft.	3"/62 ft.
Deviation from X-level (62 ft)	2"-3" (max.)	1 3/4"-2" (max.)
Rail Joints	1 bolt (min.)	2 bolts (min.)
Spikes/Rail/Tie*	2 (min.)	2 (min.)
Joint Support	48" between ties, 24" from center of joint to centerline nearest tie.	Same

*Based on F.R.A. Section 213 Standards prior to September, 1982.



F.R.A. Class I



F.R.A. Class II

APPENDIX C

RAIL GEOMETRY

Rail Geometry Assumptions

In lieu of design speeds from the B&M Corporation on each branch line, our assessment of each curve's design speed was made based on field measurements. Findings are contained in computation sheets 1-17, attached.

Curve Design Criteria

Curve No.	Degree	*Class of Track
1	0°-40'	3
2	3°-30'-0°-40'	2
3	3°-30'	2
4	8°	1
5	8°	1
6	4°-30'	1
7	2°-00'-2°-30'	1
8	3°-00'	1
9	1°-00'	1
10	3°-30'	1

*Based on existing track and geometry

Track Curve Locations

Curve No.	Location
1	Near Barberry Lane
2	North of Cutters Lane
3	Between Cutters Lane and Portsmouth Road
4	Portsmouth Yard
5	Portsmouth Yard
6	Market Street
7	South of Cutts Avenue
8	North of Cutts Avenue
9	South of Newington Line
10	South of Newington Line

REFERENCE

IN CHARGE OF S.R.W.

MADE BY F.J.O. DATE 10/15 - 10/18/84

CHECKED BY DATE

JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 1, 0°-40' (FROM TRACK CHART) ASSUMED CLASS 3

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
-2	-1		+1/4	-1/8		---		-1/8
-1	0		+1/2	-1/4		0		-1/4
0	0		+1/2	-1/8	0	0	+1/2	-1/8
1	10	0.62°	+1	+1/4	3/8	-38	+5/8	+1/4
2	6	0.375°	+1 3/8	0	3/4	-42	+5/8	0
3	-10	-0.62°	+1 7/8	-1/8	1 1/8	-58	+3/4	-1/8
4	13	0.81°	+1 7/8	-1/8	1 1/2	-35	+3/8	-1/8
5	22	1.37°	+2 3/8	-1/4	1 7/8	-26	+1/2	-1/4
6	22	1.37°	+2 3/4	-1/8	2 1/4	-26	+1/2	-1/8
7	19	1.19°	+2 1/2	-1/2	2 5/8	-29	-1/8	-1/2
8	17	1.06°	+3 3/8	-1/8	3	-31	+3/8	-1/8
9	14	0.88°	+3 1/4	+1/4	3	-34	+1/4	+1/4
10	9	0.56°	+3 3/8	+1/4	3	-39	+3/8	+1/4
11	8	0.5°	+3 3/4	-1/8	3	-40	+3/4	-1/8
12	8	0.5°	+3 3/8	0	3	-40	+3/8	0
13	15	0.94°	+3 7/8	0	3	-33	+7/8	0
14	12	0.75°	+3 1/4	+1/8	3	-36	+1/4	+1/8
15	20	1.25°	+3 1/2	+1/4	3	-28	+1/2	+1/4
16	2	0.125°	+3 5/8	+3/8	3	-46	+5/8	+3/8
17	1	0.06°	+3 5/8	+1/4	3	-47	+5/8	+1/4
18	2	0.125°	+3 5/8	-1/4	3	-46	+5/8	-1/4
19	10	0.62°	+3 5/8	0	3	-36	+5/8	0
20	14	0.88°	+3 1/4	0	3	-34	+1/4	0
21	24	1.5°	+3	-1/4	3	-24	0	-1/4
22	6	0.375°	+3 1/4	+1/16	3	-42	+1/4	+1/16
23	13	0.81°	+2 7/8	+1/16	3	-35	-1/8	+1/16
24	4		+3 3/8	+1/8	3	-44	+3/8	+1/8
25	12		+3 1/8	-3/8	3	-36	+1/8	-3/8

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City of Portsmouth, NH
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CURVE NO. 1, 0°-40' (FROM TRACK CHART) ASSUMED CLASS 3

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3" MAX	GAGE -½ to +1½
26	12	0.75°	+3	0	3	-36	0	0
27	14	0.88°	+2 7/8	+1/4	3	-34	-1/8	+1/4
28	11	0.68°	+2 7/8	+3/8	3	-37	-1/8	+3/8
29	20	1.25°	+3	+3/8	3	-28	0	+3/8
30	13	0.81°	+2 3/4	0	3	-35	-1/4	0
31	15	0.93°	+2 7/8	0	3	-33	-1/8	0
32	10	0.62°	+3	-1/4	3	-38	0	-1/4
33	6	0.38°	+2 7/8	-1/4	3	-42	-1/8	-1/4
34	7	0.44°	+2 3/8	0	2 5/8	-41	-1/4	0
35	2	0.12°	+2	-1/8	2 1/4	-46	-1/4	-1/8
36	3	0.18°	+1 3/4	0	1 7/8	-45	-1/8	0
37	-1	-0.06°	+1 7/8	-1/4	1 1/2	-49	+3/8	-1/4
38	0	---	+1½	-1/4	1 1/8	-48	+3/8	-1/4
39	+2	0.125°	+1 1/8	+1/8	3/4	-46	+3/8	+1/8
40	0	---	+1/2	-1/8	3/8	-48	+1/8	-1/8
41	-1	-0.06°	0	-1/4	0	-49	0	-1/4
42								
43								
44								
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CURVE NO. 2, 3°-30' & 0°-40' (FROM TRACK CHART) ASSUMED CLASS 2

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3" MAX	GAGE -½ to +1½
-2	0	0.25°	+1/8	-1/8	0	0	+1/8	-1/8
-1	4	0.25°	+1/4	-1/8	3/8	-44	-1/8	-1/8
0	8	0.5°	+3/4	+1/8	3/4	-40	0	+1/8
1	9	0.56°	+1 1/8	+1/8	1 1/8	-39	0	+1/8
2	28	1.75°	+1	+1/8	1 1/2	-20	-1/2	+1/8
3	47	2.93°	+1 3/8	+1 1/8	1 7/8	-1	-1/2	+1 1/8
4	48	3°	+2 1/8	+1/2	2 1/4	0	-1/8	+1/2
5	57	3.56°	+2 3/4	+7/8	2 5/8	+9	+1/8	+7/8
6.	52	3.25°	+3¼	+7/8	3	+4	+1/4	+7/8
7	65	4.06°	+3¼	+5/8	3	+17	+1/4	+5/8
8	52	3.25°	+4	+5/8	3	+4	+1	+5/8
9	50	3.12°	+4 1/8	+3/8	3	+2	+1 1/8	+3/8
10	54	3.37°	+3½	+1/4	3	+6	+1/2	+1/4
11	56	3.5°	+3 3/8	+1/2	3	+8	+3/8	+1/2
12	52	3.56°	+3 7/8	+1/4	3	+4	+7/8	+1/4
13	56	2.87°	+3 3/4	+5/8	3	+8	+3/4	+5/8
14	57	3.25°	+3½	+1/2	3	+9	+1/2	+1/2
15	46	3.87°	+3¼	+7/8	3	-2	+1/4	+7/8
16	52	4.06°	+4¼	+3/8	3	+4	+1 1/4	+3/8
17	62	3.87°	+2 7/8	+1/4	3	+14	-1/8	+1/4
18	65	4.06°	+3 1/8	+3/4	3	+17	+1/8	+3/4
19	46	2.88°	+3½	+5/8	3	-2	+1/2	+5/8
20	68	4.25°	+4	+7/8	3	+20	+1	+7/8
21	49	3.06°	+4 5/8	+1/2	3	+1	+1 5/8	+1/2
22	47	2.93°	+5	+1/4	3	-1	+2	+1/4
23	45	2.81°	+5¼	0	3	-3	+2 1/4	0
24	64	4°	+4 7/8	0	3	+16	+1 7/8	0
25	40	2.5°	+4 5/8	+1/8	3	-8	+1 5/8	+1/8

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CURVE NO. 2,3°-30' & 0°-40' (FROM TRACK CHART) ASSUMED CLASS 2

	EXISTING TRACK GEOMETRY				ASSUMED	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)	DESIGN ELEV. (IN.)	ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
26	35	2.18°	+3 7/8	-1/4	3	-13	+7/8	-1/4
27	77	4.81°	+3 3/8	+1/8	3	+29	+3/8	+1/8
		Turnout						
28	75	4.68°	+3 1/2	+3/8	3	+27	+1/2	+3/8
		Turnout						
29	51	3.18°			3	+3		
		Sw. Pt.						
30	76	4.75°	+4 5/8	+3/4	3	+28	+1 5/8	+3/4
31	22	1.375°	+4 3/4	+1/4	3	-26	+1 3/4	+1/4
32	21	1.31°	+5 3/8	+3/8	3	-27	+2 3/8	+3/8
33	7	0.44°	+5 1/4	+1/4	3	-41	+2 1/4	+1/4
34	20	1.25°	+5 1/2	+7/8	3	-28	+2 1/2	+7/8
35	-8	-0.5°	+6	+1/4	2 5/8	-56	+3 3/8	+1/4
36	10	0.625°	+6 1/4	+1/2	2 1/4	-38	+4	+1/2
37	19	1.19°	+6 1/2	+3/8	1 7/8	-29	+4 5/8	+3/8
38	6	0.375°	+5 1/2	+1/4	1 7/8	-42	+3 5/8	+1/4
39	17	1.06°	+5 1/4	+1/8	1 7/8	-31	+3 3/8	+1/8
40	4	0.25°	+4	+1/4	1 7/8	-44	+2 1/8	+1/4
41	15	0.94°	+2 7/8	-1/4	1 7/8	-33	+1	-1/4
42	14	0.87°	+2 3/4	-1/2	1 7/8	-34	+7/8	-1/2
		Putxing						
43	6	0.37°	+2 1/4	+1/8	1 1/2	-42	+3/4	+1/8
44	-3	0.18°	+1 1/8	0	1 1/8	-51	0	0
		Cattle Pass						
45	12	0.75°	+5/8	-1/4	3/4	-36	-1/8	-1/4
46	-6	0.37°	+1/4	-1/8	3/8	-54	-1/8	-1/8
47	3	0.18°	0	0	0	-45	0	0
48								
49								
50								
51								
52								
53								
54								
55								

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CURVE NO. 3, 3°-30' (FROM TRACK CHART) ASSUMED CLASS 2

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3" MAX	GAGE -½ to +1½
-2								
-1								
0	Turnout P.F.		+3/8	+1/8	0	---	+3/8	+1/8
1	12	0.75°	+1/4	+3/8	1/4	-36	0	+3/8
2	57	3.56°	+1/8	+5/8	1/2	+9	-3/8	+5/8
3	86	5.37°	+1/2	+5/8	3/4	+38	-1/4	+5/8
4	121	7.56°	+1 5/8	+1/8	1	+73	+5/8	+1/8
5	62	3.88°	+1 1/2	-1/8	1 1/4	+14	-1/4	-1/8
6	100	6.25°	+1 1/8	+1/2	1 1/2	+52	-3/8	+1/2
7	96	6°	+1	+3/4	1 3/4	+48	-3/4	+3/4
8	67	4.18°	+3/8	+1/2	2	+19	-1 5/8	+1/2
9	36	2.25°	+7/8	+1/8	2 1/4	-12	-1 3/8	+1/8
10	30	1.87°	+1 1/8	+1/4	2 1/2	-18	-1 3/8	+1/4
11	24	1.5°	+1 1/8	+3/8	2 3/4	-24	-1 5/8	+3/8
12	20	1.25°	+2	+3/8	3	-28	-1	+3/8
13	18	1.12°	+1 1/2	0	3	-30	-1 1/2	0
14	39	2.44°	+1 7/8	+1/2	3	-9	-1 1/8	+1/2
15	11	0.69°	+2	0	3	-37	-1	0
16	47	2.93°	+1 1/2	+3/4	3	-1	-1 1/2	+3/4
17	62	3.87°	+1 1/2	-1/8	3	+14	-1 1/2	-1/8
18	66	4.12°	xing	---	3 (Barberry ln)			---
19	60	3.75°	xing	---	3	+12	---	---
20	81	5.06°	+1	+7/8	3	+33	-2	+7/8
21	42	2.62°	+1 3/4	+3/8	3	-6	-1 1/4	+3/8
22	56	3.5°	+2 1/8	+1/8	3	+8	-7/8	+1/8
23	50	3.13°	+2 5/8	+3/8	3	+2	-3/8	+3/8
24	52	3.25°	+3 1/8	+3/8	3	+4	+1/8	+3/8
25	55	3.44°	+3 3/8	+1	3	+7	+3/8	+1

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CURVE NO. 3, 3°-30' (FROM TRACK CHART) ASSUMED CLASS 2

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
26	50	3.12°	+3 3/8	+5/8	3	+2	+3/8	+5/8
27	49	3.06°	+3 1/2	+3/8	3	+1	+1/2	+3/8
28	54	3.38°	+3 1/4	+3/8	2 3/4	+6	+1/2	+3/8
29	43	2.69°	+3 5/8	+1/2	2 1/2	-5	+1 1/8	+1/2
30	50	3.12°	+4	+3/8	2 1/4	+2	+1 3/4	+3/8
31	47	2.94°	+3 1/4	+1/8	2	-1	+1 1/4	+1/8
32	38	2.38°	+3 1/4	+0	1 3/4	-10	+1 1/2	+0
33	23	1.44°	+2 3/4	+1/8	1 1/2	-25	+1 1/4	+1/8
34	-9	-0.56°	+2 1/4	+1/8	1 1/4	-57	+1	+1/8
35	0	0°	+1 1/4	+1/4	1	0	+1/4	+1/4
36			+3/8	0	3/4		-3/8	0
37			+1/2	+3/8	1/2		0	+3/8
38			0	+1/8	1/4		-1/4	+1/8
39	Gage & X Level Only		-1/4	0	0		-1/4	0
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								
54								
55								

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CURVE NO. 4,8° (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
-2								
-1								
0		Road	Xing		0			
1					0			
2		Road	Xing		0			
3	182	11.37°	-7/8	+7/8	0	+134	-7/8	+7/8
4	114	7.12°	-3/8	+1/2	0	+66	-3/8	+1/2
5	86	5.37°	0	+1	0	+38	0	+1
6	68	4.25°	-1/8	+3/8	0	+20	-1/8	+3/8
7	92	5.75°	+1/4	+3/4	0	+44	+1/4	+3/4
8	46	2.88°	+1/8	-1/8	0	-2	+1/8	-1/8
9	65	4.06°	0	0	0	+17	0	0
10	92	5.75°	-1/8	+3/8	0	+44	-1/8	+3/8
11	99	6.18°	-1/4	+3/4	0	+51	-1/4	+3/4
12	94	5.88°	+1/4	0	0	+46	+1/4	0
13	138	8.62°	+3/8	+1/2	0	+90	+3/8	+1/2
14	169	10.56°	+5/8	+5/8	0	+121	+5/8	+5/8
15	148	9.25°	+1/4	+1 1/8	0	+100	+1/4	+1 1/8
16	184	11.5°	+1/2	+1/4	0	+136	+1/2	+1/4
17	143	8.93°	+1/4	+1	0	+95	+1/4	+1
18	73	4.56°	+1 5/8	+1/8	0	+25	+1 5/8	+1/8
19	1	0.06°	+7/8	0	0	-47	+7/8	0
20	-6	-0.375°	+3/4	0	0	-54	+3/4	0
21		Roadway			0			
22		Roadway			0			
23		Roadway			0			
24								
25								

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CURVE NO. 5,8° (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
-2								
-1								
0	-1	-0.62°	+5/8	0	0	-49	+5/8	0
1	-1	-0.62°	+3/4	+1/8	0	-49	+3/4	+1/8
2	4	0.25°	0	-3/8	0	+44	0	-3/8
3	5	0.31°	+5/8	-1/2	0	+43	+5/8	-1/2
4	94	5.87°	+1/8	+3/8	0	+46	+1/8	+3/8
5	120	7.5°	+1/8	+3/8	0	+72	+1/8	+3/8
6	152	9.5°	0	+1	0	+104	0	+1
7	110	6.88°	Roadway		0	+62	---	
8	164	10.25°	Roadway		0	+116	---	
9	164	10.25°	Roadway		0	+116	---	
10	91	5.69°	Roadway		0	+43	---	
11	82	5.12°	Roadway		0	+34	---	
12	95	5.94°	Roadway		0	+47	---	
13	135	8.44°	Roadway		0	+87	---	
14	184	11.5°	-5/8	+7/8	0	+136	-5/8	+7/8
15	128	8	+3/8	+1/2	0	+80	+3/8	+1/2
16	109	6.81°	+1 3/8	+3/8	0	+61	+1 3/8	+3/8
17	153	9.56°	+1/2	+3/4	0	+105	+1/2	+3/4
18	89	5.56°	+1/8	+3/8	0	+41	+1/8	+3/8
19	151	9.43°	-1/2	+5/8	0	+103	-1/2	+5/8
20	137	8.56°	0	+1/2	0	+89	0	+1/2
21	67	4.18°	0	+1/8	0	+19	0	+1/8
22	8	0.5°	Switch	---	0	-40	---	---
23	-4	-0.25°	0	0	0	-52	0	0
24								
25								

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CURVE NO. 6,4°-30' (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
-2	---							
-1	---							
0	0		0	+1/8	0	0	0	+1/8
1	15	.93°	+3/8	0	0	-33	+3/8	0
2	70	4.37°	Switch	---	0	+22	---	---
3	102	6.37°	Turnout	---	0	+54	---	---
4	122	7.62°	Frog	---	0	+74	---	---
5	77	4.81°	-1/2	+1/8	0	+29	-1/2	+1/8
6	71	4.43°	-7/8	+1/2	0	+23	-7/8	+1/2
7	48	3°	-1/4	0	0	0	-1/4	0
8	61	3.8°	-3/8	+1/8	0	+13	-3/8	+1/8
9	30	1.87°	-1/4	0	0	-18	-1/4	0
10	-1		-1/2	+5/8	0	-49	-1/2	+5/8
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

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CURVE NO. 7, 2°-00' & 2°-30' (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3" MAX	GAGE -½ to +1½
-2	---							
-1	---							
0	-1		-1/4	-1/8	0	-49	-1/4	-1/8
1	-3		+1	-1/8	0	-51	+1	-1/8
2	32	2°	+1 1/2	-1/8	0	-16	+1 1/2	-1/8
3	19	1.19°	+1 1/4	-3/4	0	-29	+1 1/4	-3/4
4	29	1.81°	+1 5/8	+3/8	0	-19	+1 5/8	+3/8
5	3	0.19°	+3/4	0	0	-45	+3/4	0
6	42	2.62°	+1/2	+1/4	0	-6	+1/2	+1/4
7	9	0.56°	+1	-3/8	0	-39	+1	-3/8
8	32	2°	+1	-1/8	0	-16	+1	-1/8
9	21	1.31°	+1 1/4	0	0	-27	+1 1/4	0
10	28	1.75°	+3/4	0	0	-20	+3/4	0
11	28	1.75°	+7/8	-1/4	0	-20	+7/8	-1/4
12	8	0.5°	+1	-1/4	0	-40	+1	-1/4
13	55	3.44°	-3/8	+1/8	0	+7	-3/8	+1/8
14	51	3.19°	-3/4	-1/2	0	+3	-3/4	-1/2
15	8	0.5°	+1/8	+1/8	0	-40	+1/8	+1/8
16	30	1.88°	+1/2	+3/4	0	-18	+1/2	+3/4
17	31	1.94°	Guard Rail		0	-17	---	---
18	24	1.5°	+7/8	+3/8	0	-24	+7/8	+3/8
19	47	2.94°	+7/8	+3/8	0	-1	+7/8	+3/8
20	60	3.75°	+1 1/8	+3/8	0	+12	+1 1/8	+3/8
21	31	1.94°	+1/2	+3/8	0	-17	+1/2	+3/8
22	46	2.88°	+3/8	+1/2	0	-2	+3/8	+1/2
23	25	1.56°	+1	+1/8	0	-23	+1	+1/8
24	37	2.3°	0	+5/8	0	-11	0	+5/8
25	57	3.56°	+1/2	+5/8	0	+9	+1/2	+5/8

ANDREWS & CLARK, INC.
CONSULTING ENGINEERS

COMPUTATIONS

REFERENCE

IN CHARGE OF S.R.W.

MADE BY F.J.O. DATE 10/15 - 10/18/84

CHECKED BY DATE

JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 7, 2°-00' & 2°-30' (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
26	64	4°	-3/8	+1/4	0	+16	-3/8	+1/4
27	46	2.88°	+7/8	+1	0	-2	+7/8	+1
28	33	2.06°	+1 7/8	+7/8	0	-15	+1 7/8	+7/8
29	59	3.69°	+1 3/4	+7/8	0	+11	+1 3/4	+7/8
30	34	2.125°	+1 3/8	+5/8	0	-14	+1 3/8	+5/8
31	56	3.5°	+3/8	+3/4	0	+8	+3/8	+3/4
32	12	0.75°	+3/8	+3/8	0	-36	+3/8	+3/8
33	27	1.68°	+3/8	+1/8	0	-21	+3/8	+1/8
34	5	0.3°	0	-1/4	0	-43	0	-1/4
35	20	1.25°	0	+3/8	0	-28	0	+3/8
36	47	2.94°	-5/8	+1	0	-1	-5/8	+1
37	30	1.88°	-3/4	+1	0	-18	-3/4	+1
38	-5	-0.3°	-1/2	+1/8	0	-53	-1/2	+1/8
39	30	1.88°	-5/8	+3/8	0	-18	-5/8	+3/8
40	40	2.5°	-3/8	+3/8	0	-8	-3/8	+3/8
41	70	4.38°	-1/8	+7/8	0	+22	-1/8	+7/8
42	27	1.69°	+3/8	+3/4	0	-21	+3/8	+3/4
43	32	2°	+1/4	+1/4	0	-16	+1/4	+1/4
44	31	1.93°	-1/2	+5/8	0	-17	-1/2	+5/8
45	56	3.5°	-7/8	+3/4	0	+8	-7/8	+3/4
46	30	1.88°	-3/4	+1/4	0	-18	-3/4	+1/4
47	42	2.62°	-7/8	+3/4	0	-6	-7/8	+3/4
48	41	2.56°	0	+3/4	0	-7	0	+3/4
49	11	0.69°	+3/4	-1/4	0	-47	+3/4	-1/4
50	22	1.37°	+3/4	0	0	-26	+3/4	0
51	21	1.31°	+5/8	-1/8	0	-27	+5/8	-1/8
52	30	1.88°	+1	+1/8	0	-18	+1	+1/8
53	17	1.06°	+1 3/8	+1/4	0	-31	+1 3/8	+1/4
54	18	1.12°	+1 1/4	+1/4	0	-30	+1 1/4	+1/4
55	24	1.5°	+1 3/8	+1/2	0	-24	+1 3/8	+1/2

ANDREWS & CLARK, INC.
CONSULTING ENGINEERS

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JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 7, 2°-00' & 2°-30' (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3" MAX	GAGE -½ to +1½
56	64	4°	+7/8	+3/8	0	+16	+7/8	+3/8
57	71	4.44°	+7/8	+3/4	0	+23	+7/8	+3/4
58	30	1.88°	+1 1/8	-1/8	0	-18	+1 1/8	-1/8
59	44	2.75°	+5/8	+5/8	0	-4	+5/8	+5/8
60	42	2.63°	+1	+5/8	0	-6	+1	+5/8
61	27	1.69°	+1	0	0	-21	+1	0
62	10	0.62°	+1	-1/4	0	-38	+1	-1/4
63	10	0.62°	+1 1/8	+1/4	0	-38	+1 1/8	+1/4
64	21	1.31°	+1	0	0	-27	+1	0
65	22	1.37°	+1 3/8	0	0	-26	+1 3/8	0
66	24	1.5°	+1 3/8	+1/8	0	-24	+1 3/8	+1/8
67	35	2.18°	+1 3/8	+1/4	0	-13	+1 3/8	+1/4
68	36	2.25°	+1 1/4	+1/2	0	-12	+1 1/4	+1/2
69	26	1.62°	+7/8	-1/8	0	-22	+7/8	-1/8
70	28	1.75°	Xing	Xing	0	-20	---	Xing
71	63	3.93°	-5/8	+5/3	0	+15	-5/8	+5/8
72	46	2.87°	+3/8	+1/8	0	-2	+3/8	+1/8
73	15	0.93°	+1	+1/4	0	-33	+1	+1/4
74	-20	-1.25°	+7/8	0	0	-6	+7/8	0
75	-8	-0.5°	+5/8	+1/4	0	-56	+5/8	+1/4
76	+3	0.18°	+1/2	0	0	-45	+1/2	0
77	+0	0	+1/2	-1/8	0	0	+1/2	-1/8
78	0	0	0	0	0		0	0
79								
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ANDREWS & CLARK, INC.
CONSULTING ENGINEERS

COMPUTATIONS

REFERENCE

IN CHARGE OF S.R.W.

MADE BY F.J.O. DATE 10/15 - 10/18/84

CHECKED BY DATE

JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 8, 3° (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3" MAX	GAGE -½ to +1½
-2								
-1	0	0	0	0	0	0	0	0
0	-1	-0.06°	-5/8	+1/4	3/8	-49	-1	+1/4
1	24	1.5°	-2	+1/4	3/4	-24	-2 3/4	+1/4
2	-16	-1°	-1 5/8	-1/8	1 1/8	-64	-2 3/4	-1/8
3	21	1.31°	-1	+1/4	1 1/2	-27	-2 1/2	+1/4
4	19	1.18°	-3/8	+1/4	1 7/8	-29	-2 1/4	+1/4
5	41	2.56°	-3/4	+5/8	1 7/8	-7	-2 5/8	+5/8
6	30	1.87°	-1/4	+1/2	1 7/8	-18	-2 1/8	+1/2
7	80	5°	-7/8	+7/8	1 7/8	+32	-2 3/4	+7/8
8	15	0.93°	+1/2	+1/8	1 7/8	-33	-1 3/8	+1/8
9	75	4.68°	+1/2	+1/2	1 7/8	+27	-1 3/8	+1/2
10	23	1.43°	+1 1/8	-1/8	1 7/8	-25	-3/4	-1/8
11	47	2.93°	+1 3/8	+1/4	1 7/8	-1	-1/2	+1/4
12	83	5.18°	+3/4	+3/4	1 7/8	+35	-1 1/8	+3/4
13	27	1.68°	+1 3/4	-1/8	1 7/8	-21	-1/8	-1/8
14	60	3.75°	+1 1/2	+3/4	1 7/8	+12	-3/8	+3/4
15	17	1.06°	+1/2	0	1 7/8	-31	-1 3/8	0
16	58	3.62°	-1/8	+5/8	1 7/8	+10	-2	+5/8
17	43	2.68°	+3/4	+1/4	1 7/8	-5	-1 1/8	+1/4
18	55	3.44°	+1	+1/8	1 7/8	+7	-7/8	+1/8
19	34	2.12°	+1 1/4	-3/8	1 7/8	-14	-5/8	-3/8
20	55	3.43°	+3/8	+1/4	1 7/8	+7	-1 1/2	+1/4
21	60	3.75°	+1/2	+5/8	1 7/8	+12	-1 3/8	+5/8
22	39	2.43°	SW PT	---	1 7/8	-9	---	---
23	38	2.37°	+1 1/2	-1/16	1 7/8	-10	-3/8	-1/16
24	65	4.06°	+1 3/4	-1/4	1 7/8	+17	-1/8	-1/4
25	41	2.56°	+1 5/8	-1/4	1 7/8	-7	-1/4	-1/4
26								

ANDREWS & CLARK, INC.
CONSULTING ENGINEERS

COMPUTATIONS

REFERENCE

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MADE BY F.J.O. DATE 10/15 - 10/18/84

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JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 8, 3° (FROM TRACK CHART) ASSUMED CLASS 1

	EXISTING TRACK GEOMETRY				ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½ to +1½
26	32	2°	+1 1/8	+3/4	1 7/8	-16	-3/4	+3/4
27	37	2.31°	+1	+3/4	1 7/8	-11	-7/8	+3/4
28	51	3.18°	0	+1/4	1 7/8	+3	-1 7/8	+1/4
29	70	4.38°	-1/4	+1/4	1 7/8	+22	-2 1/8	+1/4
30	44	2.75°	0	+3/4	1 7/8	-4	-1 7/8	+3/4
31	39	2.43°	-1/4	+1/2	1 7/8	-9	-2 1/8	+1/2
32	77	4.81°	-5/8	+3/4	1 7/8	+29	-2 1/2	+3/4
33	14	0.88°	0	+1/2	1 7/8	-34	-1 7/8	+1/2
34	37	2.31°	0	0	1 1/2	-11	-1 1/2	0
35	47	2.94°	-1 1/4	+1/4	1 1/8	-1	-2 3/8	+1/4
36	10	0.62°	-3/4	+1/4	3/4	-38	-1 1/2	+1/4
37	3	0.18°	-1 1/2	0	3/8	-45	-1 7/8	0
38	0	0	-3/8	-1/8	0	0	-3/8	-1/8
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ANDREWS & CLARK, INC.
CONSULTING ENGINEERS
COMPUTATIONS

REFERENCE
IN CHARGE OF S.R.W.
MADE BY F.J.O. DATE 10/15 - 10/18/84
CHECKED BY DATE

JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 9,1° (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
-1								
-2								
0	2	0.125°	0	-1/8	0	-46	0	-1/8
1	-11	-0.68°	+7/8	0	3/8	-59	+1/2	0
2	4	0.25°	+1¼	-1/4	3/4	-44	+1/2	-1/4
3	21	1.31°	+7/8	-1/8	1 1/8	-27	-1/4	-1/8
4	5	0.31°	+1½	-1/4	1 1/2	-43	0	-1/4
5	6	0.37°	+2	-1/8	1 7/8	-42	+1/8	-1/8
6	32	2°	+2	0	1 7/8	-16	+1/8	0
7	22	1.38°	+2 3/8	+1/4	1 7/8	-26	+1/2	+1/4
8	-4	-0.25°	+2 3/8	-1/4	1 7/8	-52	+7/8	-1/4
9	45	2.81°	+2 7/8	+1/4	1 7/8	-3	+1	+1/4
10	10	0.62°	+2½	0	1 7/8	-38	+5/8	0
11	6	0.38°	+1 3/4	-1/2	1 7/8	-42	-1/8	-1/2
12	35	2.18°	+2¼	0	1 7/8	-13	+3/8	0
13	-4	-0.25°	+2 3/8	-1/4	1 7/8	-52	+1/2	-1/4
14	10	0.62°	+1 5/8	-1/4	1 7/8	-38	-1/4	-1/4
15	24	1.5°	+1 7/8	0	1 7/8	-24	0	0
16	32	2°	+1½	-1/4	1 7/8	-16	-3/8	-1/4
17	-4	-0.25°	+3	-1/4	1 7/8	-52	+1 1/8	-1/4
18	-9	-0.56°	+3¼	-1/8	1 7/8	-57	+1 3/8	-1/8
19	18	1.12°	+2 7/8	-1/2	1 7/8	-30	+1	-1/2
20	15	0.93°	+2 1/8	-1/4	1 7/8	-33	+1/4	-1/4
21	11	0.68°	+1½	-1/4	1 7/8	-37	-3/8	-1/4
22	37	2.31°	+1¼	-1/8	1 7/8	-11	-5/8	-1/8
23	20	1.25°	+3/4	-1/8	1 7/8	-28	-1 1/8	-1/8
24	9	0.56°	+3/4	0	1 7/8	-39	-1 1/8	0
25	-2	-0.12°	+5/8	-1/4	1 7/8	-50	-1 1/4	-1/4

ANDREWS & CLARK, INC.
CONSULTING ENGINEERS
COMPUTATIONS

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JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 9, 1° (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
26	9	0.56°	+1/2	-1/4	1 7/8	-39	-1 3/8	-1/4
27	14	0.88°	+1	0	1 7/8	-34	-7/8	0
28	10	0.62°	+3/4	-1/8	1 1/2	-38	-3/4	-1/8
29	23	1.43°	+7/8	-1/4	1 1/8	-25	-1/4	-1/4
30	6	0.375°	+1/2	-1/4	3/4	-42	-1/4	-1/4
31	16	1°	+1/2	0	3/8	-32	+1/8	0
32	Turnout				0		---	
33	Turnout							
34	Turnout							
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ANDREWS & CLARK, INC.
CONSULTING ENGINEERS

COMPUTATIONS

REFERENCE

IN CHARGE OF S.R.W.

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JOB 940-PO-101
City of Portsmouth, NH
Railroad Track Survey
Evaluation Project

CURVE NO. 10, 3°-30' (FROM TRACK CHART) ASSUMED CLASS 1

EXISTING TRACK GEOMETRY					ASSUMED DESIGN ELEV. (IN.)	DEVIATION LIMITS		
STA.	ORDINATE 1/16" (DESIGN 48)	CALCULATED DEGREE	ELEV. (IN.)	GAGE (IN.)		ORDINATE MAX=80	ELEV. ±3"MAX	GAGE -½to+1½
-2		TURNOUT						
-1		TURNOUT						
0	14	0.88°	Frog			-34		
1	4	0.25°	0	-1/4		-44		-1/4
2	54	3.37°	Switch PL			+6		
3	30	1.87°	+1 1/8	-1/8	1 1/8	-18	0	-1/8
4	39	2.43°	+5/8	+1/4	1 1/2	-9	-7/8	+1/4
5	84	5.25°	0	+1/8	1 7/8	+36	-1 7/8	+1/8
6	73	4.56°	+1/2	+5/8	1 7/8	+25	-1 3/8	+5/8
7	42	2.62°	+1/4	0	1 7/8	-6	-1 5/8	0
8	32	2°	+1/2	+1/4	1 7/8	-16	-1 3/8	+1/4
9	95	5.94°	-3/8	+5/8	1 7/8	+47	-2 1/4	+5/8
10	27	1.68°	+1/4	-1/4	1 7/8	-21	-1 5/8	-1/4
11	79	4.93°	+1/2	+7/8	1 7/8	+31	-1 3/8	+7/8
12	63	3.93°	+1 1/8	+5/8	1 7/8	+15	-3/4	+5/8
13	53	3.31°	+1½	+1/4	1 7/8	+5	-3/8	+1/4
14	26	1.62°	+1 3/4	+0	1 7/8	-22	-1/8	+0
15	58	3.625°	+1¼	+5/8	1 7/8	+10	-5/8	+5/8
16	70	4.38°	+1	+3/4	1 7/8	+22	-7/8	+3/4
17	27	1.69°	+1	-1/8	1 7/8	-31	-7/8	-1/8
18	46	2.88°	+1	-1/4	1 7/8	-2	-7/8	-1/4
19	29	1.81°	+1/2	-1/2	1 7/8	-19	-1 3/8	-1/2
20	PAST CITY LINE							
21								
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Appendix D
Supplemental Information

RECEIVED
JAN 21 1985
ANDREWS & CLARK INC.

REGULAR MEETING
PLANNING BOARD
PORTSMOUTH, NEW HAMPSHIRE

7:30 P.M. CITY COUNCIL CHAMBERS DECEMBER 20, 1984

MEMBERS PRESENT: Arthur Parrott, Vice-Chairman; Milton "Red" Grant, Kevin Niland, Michael Dunbar, Richard Hopley, Building Inspector

MEMBERS ABSENT: E. Warren Clarke, Chairman; Calvin A. Canney, City Manager; Charles M. Eldredge, City Council Representative; and Mark Brenner

ALSO PRESENT: Samuel A. Cioffi, Planning Director; David M. Holden, Planner I

* *

III. NEW BUSINESS

A) REPORT: PORTSMOUTH RAILROAD TRACK SURVEY AND EVALUATION

Mr. Parrott introduced Mr.White of the firm of Andrews & Clark of Amherst, NH narrated a slide presentation covering the highlights of his firm's report. He pointed out that recommendations are based upon FRA Class I and Class II standards -- Class I is 10 m.p.h. for freight; Class II is 25 m.p.h. for rail freight. Mr. White pointed out vegetation problems in certain areas of the track inspection; but also indicated that this is not addressed in the criteria for Class I or Class II; he pointed out a drainage problem in the area of the I-95 underpass. He stated that in all 8 defects were found and were basically joint and tie defects.

Mr. Grant inquired further into the drainage problems near Kearsarge Way and that several years ago, there was a derailment in the area. Mr. White replied that they were aware of previous derailments based on available information but that they could not find any substantial correlation between where defects were found and where previous derailments were.

Mr. Parrott referred to the indication in the Report that it was hard to come by information on derailments and that the Report indicated that the PUC (New Hampshire) did not have very useful records. Mr. White said that the "full intent in this project was more.a physical plant inspection".

In answer to queries from Mr. Parrott and Mr. Cioffi as to whether the line is safe for the way it is supposed to be use, and Mr. White replied, "At the time we inspected it, yes . . ."

COMMENTS FROM THE PUBLIC

Tom Morgan who lives on McDonough Street in close proximity to the City rail yards addressed the fact that the report did not mention some derailments which had involved LPG . . ."What distressed me most about this report was the second phase -- the rail traffic evaluation -- but I was disappointed with the rail traffic evaluation . . . They are very broad categories . . .We see a lot of rail cars go by. We see a lot of tank cars with the words, 'methyl methacrylate' written on the outside . . .You'll notice that you don't see methyl methacrylate anywhere in this report . . . can't figure if they are calling it a chemical or plastic . . . this is a liquid, highly flammable liquid, it's explosive, it's toxic . . .same class as LPG. . .(Mr. Morgan submitted a pamphlet on methyl methacrylate) . . . vapors are heavier than air . . . it has a flashpoint of 50 degrees farenheit . . ."(Mr. Morgan referred to its flashback characteristics.) (Mr. Morgan passed around a picture of a Class I flammable liquid when it's ignited.)

Mr. Morgan than discussed the Class I and Class II ratings and brought out the fact that the study had not covered the Navy Yard branch. It was also Mr. Morgan's feelings that if the Seabrook nuclear plant went on line, anything being railed out would come through Portsmouth. He stated that he would like to know the concerns of the Portsmouth Fire Department, "and if the Portsmouth Fire Department is capable and ready to deal with a catastrophe and finally the reason why I came up here tonight at all is I think the report is missing a lot of things that I've mentioned just now. The situation is much more hazardous than one would be led to believe . . . and it's going to end up in the hands of the people who regulate the Boston & Maine Railroad, the Public Utilities Commission in Concord and the Federal Railroad Administration,

and I don't want these people to get the idea that everything in Portsmouth is just hunky-dory in terms of the condition of the rails and what goes over them. So I'd ask the Planning Board to send the engineer back to the drawing board and address some of these issues before it goes on to these regulators.

Mr.White replied to Mr. Morgan's comments that their work in the area was primarily a physical plant assessment and that there is additional work to be done on the report; that the proposal did not intend to deal with the hazardous problem in itself; that as far as the Fire Department, their concern was with the proximity of fire hydrants to the rail itself, and for the most part, there is a fire hydrant near every rail crossing; that the B & M had been asked for specific numbers on the rail commodities, and they would not allow that information . . ."I do want to indicate that we had a difficult enough time getting on to the rail line itself because our understanding . . .this may have been a precedent setting study in that a private inspector, such as ourself working for a community or a private industry, was allowed to access to inspect a privately-owned rail line . . . in our initial attempts in getting this project, we understood that other firms dropped out of the running because they could not gain access to the line itself . . . this report is not complete in itself. There is an additional phase to it."

Mr. Cioffi commented that there was a "finite" amount of money available and that it (the study) was not intended to be the last word; that it would be reviewed by the City Engineer and then turned over to the City Council . . ."It was just to begin opening the door to the problems, if any, . . . There was a very limited amount of money . . . which is a very small amount of money for the scope of the project involved . . . B & M charged us to allow them - so we could get on the lines and to walk them and inspect them . . .$300 a day." He further commented that it would be up to the City Council to do a more in depth review.

DECISION OF THE BOARD

Mr. Grant moved that the Board recommend to the City Council that this survey be carried on in an intensive way and that it be financed or funded for and that it be reviewed by the City Engineer and other City officials who need to look at it. Mr. Dunbar seconded the motion.

Mr. Parrott commented that "any study and report resulting from it has to be within certain bounds".

Mr. White interjected that the intent was that the final report take into consideration comments discussed at this presentation. Mr. Cioffi asked that, "you include as an addendum, as a statement, some of the comments made this evening so that the City Council when it's reading the report is aware . . ."

There was discussion as to the "secrecy" of the commodities being transported.

It was asked that the secretary read back the motion which she stated as set forth above, and it was stated that the provision be included that the report include an addendum.

The motion passed unanimously; the motion being that the Board recommend to the City Council that this survey be carried on in an intensive way and that it be financed or funded for and that it be reviewed by the City Engineer and other City officials who need to look at it and that the report include an addendum containing some of the comments made at this evening's meeting.

STATE OF NEW HAMPSHIRE

CHAIRMAN
Paul R. McQuade
Tel. (603) 271-2431

COMMISSIONERS
Lea H. Aeschliman
Vincent J. Iacopino

PUBLIC UTILITIES COMMISSION
8 Old Suncook Road
Concord 03301

January 10, 1985

Mr. Steve White
Andrews & Clark, Inc.
Consulting Engineer
Norwich Bldg. - Bay 13
Columbia Drive
Amherst, N. H. 03031

Dear Mr. White:

Enclosed please find a copy of a letter to Mr. Thomas Morgan which lists railroad derailments in Portsmouth subsequent to 1970.

During the earlier search of the Commission records, the five (5) year period between 1975 and 1980 could not be located. A more recent search proved useful as the files were found.

I am enclosing this copy to complete your records.

If I may be of any further assistance, please do not hesitate to contact me.

Very truly yours,

N. H. PUBLIC UTILITIES COMMISSION

Walter W. King (mp)

Walter W. King
Rail Safety Division

WWK:mp

Enc.

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ANDREW S A CLARK INC.

STATE OF NEW HAMPSHIRE

CHAIRMAN
Paul R. McQuade
Tel. (603) 271-2431

COMMISSIONERS
Lea H. Aeschliman
Vincent J. Iacobino

PUBLIC UTILITIES COMMISSION
8 Old Suncook Road
Concord 03301

January 2, 1985

Mr. Thomas Morgan
7 McDonough Street
Portsmouth, N. H. 03801

Dear Mr. Morgan:

The following is a list of derailments that have occurred in Portsmouth since 1970. This list is only those derailments that were reported to this Commission.

July 6, 1977 at Emery - 3 cars - empty.

July 21, 1978 at Emery - 7 cars - sand.

October 21, 1978 - Portsmouth Yard -
3 cars - sand.

March 20, 1979 - MP 1.7 - 9 cars - sand.

November 25, 1981 - Cutts Crossing - 3 cars -
1 load LPG
1 empty LPG
1 empty box

May 27, 1983 - Portsmouth Yard - no number of cars given.

If I may provide any further information, please do not hesitate to contact me.

Very truly yours,

N. H. PUBLIC UTILITIES COMMISSION

Walter W. King
Rail Safety Division

WWK:mp

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